AP 7161 ACCESS POINT INSTALLATION GUIDE

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1 Introduction

Perfect for extending network coverage to outside areas, the AP 7161 brings the latest 802.11n 3x3 *Multiple Input Multiple Output* (MIMO) tri-radio design together with rugged outdoor performance. True perimeter security is provided using either a dedicated dual band sensor or software mode for both 2.4GHz and 5GHz bands to deliver 24x7 rogue detection and termination. The AP 7161 is optimized with Motorola Solutions WiNG 5 intelligence, extending QoS, security, and mobility services to the Access Point to support better capacity and performance. The AP 7161 is ideal for industrial, enterprise campus, video surveillance, public safety, and smartgrid utility deployments to extend to the outdoors.

Deployments can be managed using the Motorola Solutions WiNG 5 architecture. The WiNG 5 architecture is a solution designed for 802.11n networking. It leverages the best aspects of independent and dependent architectures to create a smart network that meets the connectivity, quality, and security needs of each user and their applications based on the availability of network resources, including wired networks. WiNG 5 is a Third Generation WLAN solution which incorporates the best of both the first generation Autonomous Access Point WLAN and the second generation Centralized Controller Based WLAN. The AP 7161 *Vehicle Mounted Modem* (VMM) is a software enabled profile within the WiNG 5 architecture that uses the same hardware as AP 7161 infrastructure models.

The control plane is now distributed between the Access Points and the controllers. The network administrator has the flexibility of directing the data plane either being forwarded directly from the Access Points, or via the controllers. By distributing intelligence and control between the wireless controllers and APs, the WiNG 5 network can route directly via the best path, as determined by factors including the user, the location, the application, and the available wireless and wired resources.

Once adopted by a Motorola Solutions RFS4000, RFS6000, RFS7000, or NX 9000 series controller, the AP 7161 is managed as an Adaptive AP running the WiNG 5 network management protocol. WiNG 5 networks extend the current differentiation that Adaptive APs offered to the next level by now having the services and security available at every point in the network. The traffic flow is optimized to prevent wired congestion, as well as wireless congestion. Traffic flows dynamically, based on user and application, and finds alternate routes to work around any possible network choke points. Mixed-media application optimization is the hallmark of WiNG 5 networks.

Extending the indoor network to the outdoors increases the need to guard against unwanted intruders and attackers, and monitor network performance and availability. In addition to industry standard security for clients and radio backhaul, the AP 7161 provides true perimeter security using either a dedicated dual band sensor or software mode in the 2.4GHz and 5Ghz bands. Concurrent around-the-clock dual band Network Assurance sensing and wireless traffic is provided together with spectrum analysis, eliminating the need for separate devices.

An Access Point can function as a *Wireless Intrusion Protection System* (WIPS) sensor and upload sensor mode operation information to a dedicated WIPS server. WIPS protects your wireless network, mobile devices, and traffic from attacks and unauthorized access. WIPS provides tools for standards compliance and around-the-clock 802.11a/b/g wireless network security in a distributed environment. WIPS allows administrators to identify and

accurately locate attacks, rogue devices, and network vulnerabilities in real time and permits both a wired and wireless lockdown of wireless device connections upon acknowledgement of a threat.

Capacity in video surveillance solutions is critical to the performance of many networks designed to monitor and provide safety. To assist with the deployment of video surveillance networks where the camera application resides, the AP 7161 offers band unlocked radio flexibility. The user can choose between 2.4Ghz, 5Ghz and 4.9Ghz bands for the radio type. The AP 7161 supports 3x3 MIMO technology, reaching a maximum data rate of 300 Mbps to maintain high performance and better quality of transmission.

The AP 7161 is designed to optimize network availability through preemptive intelligence which dynamically senses weak or failing signals, securely moves mobile users to alternate APs, and boosts signal power to automatically fill RF holes and ensure uninterrupted mobile user access.

The AP 7161 band unlocked radios allow flexibility and deployment options for the public safety market. The powerful radio increases coverage, performance, and obstruction penetration for outdoor use. Receiver sensitivity is increased proportionally so users have an increased ability to maintain high performance access for mobility and client devices in the network.

1.1 Document Conventions

The following graphical alerts are used in this document to indicate notable situations:

NOTE Tips, hints, or special requirements that you should take note of.

CAUTION Care is required. Disregarding a caution can result in data loss or equipment malfunction.

WARNING! Indicates a condition or procedure that could result in personal injury or equipment damage.

1.2 AP 7161 Hardware

There are currently four AP 7161 Access Point infrastructure models.

Model Part Number	Description
AP-7161-66040-US	AP 7161 OUTDOOR DUAL RADIO 802.11N AP US
AP-7161-66040-WR	AP 7161 OUTDOOR DUAL RADIO 802.11N AP INTL
AP-7161-66040-EU	AP 7161 OUTDOOR DUAL RADIO 802.11N AP EU
AP-7161-66S40-US	AP 7161 OUTDOOR DUAL RADIO 802.11N AP W/SENSOR US
AP-7161-66S40-WR	AP 7161 OUTDOOR DUAL RADIO 802.11N AP W/SENSOR INTL
AP-7161-66S40-EU	AP 7161 OUTDOOR DUAL RADIO 802.11N AP W/SENSOR EU
AP-7161-66S40-JP	AP 7161 OUTDOOR DUAL RADIO 802.11N AP W/SENSOR JP

The AP 7161 *Vehicle Mounted Modem* (VMM) is a software profile within the WiNG 5 architecture that uses the same hardware as the AP 7161 Access Point infrastructure models.

1.3 AP7161 Antenna Accessories

NOTE Antennas must be ordered separately. They are not included with the AP 7161.

The AP 7161 antenna suite includes the following optional antenna accessories. The antennas do not ship with the AP 7161 models listed in the table above and must be ordered separately.

1.3.1 AP 7161 4.9 GHz and 5 GHz Antennas

Part Number	Band	Gain	Height (inches)	Description
ML-5299-HPA10-01	4.9-5.8	10	19.5	Outdoor rated Type: dipole Gain: 10dBi@4.9GHz Connector: N-male
ML-5299-HPA5-01	5.2-5.8	5	6.75	Outdoor rated Type: dipole Gain: 5dBi@5.0GHz Connector: N-male
ML-5299-FHPA6-01	4.9-5.8	8	11	Outdoor rated Type: dipole Gain: 8dBi@4.9-5.8GHz Connector: N-male

1.3.2 AP 7161 Multi Band Antennas

Part Number	Band	Gain	Height (inches)	Description
ML-2452-HPAG5A8-01	2.4-5.8	4.5/7.5	11	Outdoor rated Type: dipole Gain: 4.5dBi@2.4GHz, 7.5dBi@5GHz, 5.5dBi@4.9GHz Connector: N-male
ML-2452-VMM3M3-036	2.4-5.8	3.6/4.0	1.5	Outdoor rated Vehicle Mounted MIMO Omni Patch Type: VMM Gain: 3.6dBi (typical) to 4.5dBi (maximum) @2.4GHz, 4.5 (typical) to 5.4 (maximum) @5.8GHz Connector: RP-SMA male

NOTE The ML-2452-HPAG5A8-01 multi band antenna is suggested for use with AP 7161 sensor models AP-7161-66S40-US and AP-7161-66S40-WR on ports R3-A and R3-B, respectively. The ML-2452-VMM3M3-036 is suggested for use with AP 7161 VMM. Three connections to the radio on either R1 or R2 are required for mobile operation.

1.3.3 AP-7161-66S40-JP Antennas

Part Number	Band	Gain	Height (inches)	Description
ML-2452-HPAG5A8-01	2.4-5.8	4.5/7.5	11	Outdoor rated Type: dipole Gain: 4.5dBi@2.4GHz, 7.5dBi@5GHz, 5.5dBi@4.9GHz Connector: N-male
ML-2452-VMM3M3-036	2.4-5.8	3.6/4.0	1.5	Outdoor rated Vehicle Mounted MIMO Omni Patch Type: VMM Gain: 3.6dBi (typical) to 4.5dBi (maximum) @2.4GHz, 4.5 (typical) to 5.4 (maximum) @5.8GHz Connector: RP-SMA male
ML-2452-HPA6X6-036	2.4-5.8	4.0/6.0	4.5	Outdoor rated Type: six port omni dipole array (3x2.4G, 3x5G) Connector: Type N male x6
ML-5299-HPA1-01R	4.9-5.8	6.0	11	Outdoor rated Type: dipole array Connector: RP-SMA male

1.4 Outdoor PoE Hardware and Mounting Accessories

The AP 7161 is a *Power over Ethernet* (PoE) device. When deployed, the use of an outdoor rated PoE power supply and mounting bracket may be required. The recommended Motorola Solutions PoE accessories are listed in the following table. For more information, see *AP 7161 Power Options Using Power over Ethernet on page 45*.

Part Number	Description
AP-PSBIAS-7161-US	Outdoor IP66 802.3AT gigabit Ethernet power injector, 100-240 VAC US
AP-PSBIAS-7161-WW	Outdoor IP66 802.3AT gigabit Ethernet power injector, 100-240 VAC International
KT-153143-01	Outdoor PoE mounting kit

1.5 AP 7161 Mounting Accessories

The AP 7161 has a flexible three piece mounting kit (KT-147407-01), together with an optional standoff extension arm (KT-150173-01) for pole mounting. When deployed as a VMM, use the vehicle mount kit (KT-158767-01). For more information, see *AP 7161 Hardware Mounting and Installation on page 23*.

Part Number	Description
KT-147407-01	AP 7161 mounting hardware kit
KT-150173-01	AP 7161 12 inch extension arm for mounting kit
KT-158767-01	AP 7161 vehicle mount

1.6 AP 7161 Weatherized Ethernet Accessory

One RJ45 weatherized connector plug is included with each AP 7161 Access Point. If additional plugs are required, they can be ordered using the part number listed in the following table:

Part Number	Description
KT-153676-01	AP 7161 RJ45 weatherized Ethernet plug

1.7 Package Contents

Carefully remove all protective packing material from around the AP 7161 Access Point and save the container for later storage and shipping. Refer to *AP 7161 Hardware on page 8* when verifying that all AP 7161 hardware has been received. Record the serial numbers on the shipping cartons and AP 7161 Access Points for warranty claims and reference during software download procedures.

NOTE Record the serial numbers on the shipping cartons and AP 7161 Access Points for warranty claims and reference during software download procedures.

When opening the shipping cartons, inspect the equipment for damage. If you find any damaged equipment or any equipment is missing, contact Motorola Solutions Support immediately.

Each AP 7161 model number (see *AP 7161 Hardware on page 8*) includes the following parts:

- AP 7161 Access Point
- Weatherproof RJ45 plug kit
- AP 7161 Access Point Installation Guide (this document)

The following items are **not** included with the AP 7161 Access Point models but can be ordered from Motorola Solutions:

- Antennas
- Mounting brackets/kits
- PoE power supply and accessories
- RFS controllers (if required)

The following items are **not** provided by Motorola Solutions and can be sourced from local hardware suppliers, partners, or distributors:

- Lightning protection unit
- Cat5E cable to connect power source
- Band clamps, lag bolts, or U-bolts
- Grounding wire
- Self-healing weatherproofing tape

When opening the shipping cartons, inspect the equipment for damaged or missing parts (see *AP 7161 Hardware on page 8*). If you find any damaged or missing equipment, contact your distributor, partner, or Motorola Solutions Support immediately.

For items that are not provided by Motorola Solutions, contact your local hardware suppliers.

1.8 Hardware Installation Guidelines

CAUTION All device wiring must comply with the *National Electric Code* (NEC) or regulations and procedures defined by the regulatory bodies of the country or region where the devices are being deployed. All local building and structure codes must be observed.

WARNING! Strictly observe the following safety precautions and warnings when installing an AP 7161 Access Point.

1.8.1 Precautions

Before installing an AP 7161 model Access Point, verify the following grounding and lightning protection notes:

- The installation professional should be familiar with all grounding requirements and regional codes and ensure that the Access Point and mounting asset are properly grounded. The grounding cable for an AP 7161 **must** be at a minimum a #10 gauge wire cross section. The cable can be attached to the unit using one of the following methods:
  - Loosen the grounding screw, insert the grounding cable into the hole below it, and tighten the screw.
  - Loosen the grounding screw, wind the grounding cable around it, and tighten the screw.
  - Attach a ring lug to the grounding cable and secure it to the unit using the grounding screw.
- To properly attach the grounding cable to the Access Point, refer to *AP 7161 Grounding Screw on page 19*.
- For Ethernet and lightning protection, it is recommended that a commercially available off-the-shelf *Lightning Protection Unit* (LPU) be used on all shielded CAT5E Ethernet connections. The LPU should be rated for outdoor use.
  - For the best possible protection, each Access Point requires an LPU be installed adjacent to the Access Point. If there is a LAN connection to an indoor network, a second LPU is required at the cable entry point to the building.

CAUTION Lightning damage is not covered under the conditions of a standard Motorola Solutions product warranty. When installed correctly, *Lightning Protection Units* (LPUs) provide the best protection from the harmful effects of lightning. Observe all regional and national codes that apply for lightning protection.

- Verify that the deployment environment has a continuous temperature range compatible with the operating temperature range of the device.

1.8.2 Warnings

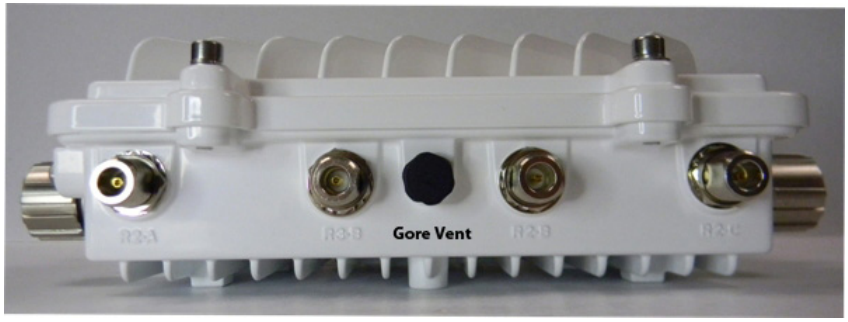
- Read all installation instructions and site survey reports, and verify correct equipment installation before connecting the Access Point to its power source.
- Remove jewelry and watches before installing this equipment.
- Verify that the unit is grounded before connecting it to the power source.
- Verify that any device connected to this unit is properly wired and grounded.
- Connect all power cords to a properly wired and grounded electrical circuit. Verify that the electrical circuits have appropriate overload protection.
- Attach only approved power cords to the device.
- Verify that the power connector and socket are accessible at all times during the operation of the equipment.
- Do not hold any component containing a radio such that it is very close to or touching any exposed parts of the body, especially the face or eyes, while transmitting.
- Do not work with power circuits in dimly lit spaces.
- Do not install this equipment or work with its power circuits during thunderstorms or other weather conditions that could cause a power surge.
- Verify there is adequate ventilation around the device, and that ambient temperatures meet equipment operation specifications.
- Avoid contact with overhead power lines.
- Take precautions to avoid injury from falling tools and equipment. Crews should wear hard hats in and around the installation work site.
- Be aware of vehicular traffic in and around the installation work site.
- Do not operate a portable transmitter near unshielded blasting caps or in an environment where explosives are present unless the transmitter is especially certified for such use.
- Refer to your site survey and network analysis reports to determine specific requirements for each deployment.
- Assign installation responsibility to the appropriate personnel.
- Identify and document where all installed components are located.
- Identify and prepare Ethernet and console port connections.
- Verify that cable lengths are within the maximum allowable distances for optimal signal transmission.

CAUTION The maximum length allowed for PoE cables is 100 meters.

1.9 Access Point Placement

Observe the following recommended guidelines to help ensure a successful network deployment:

- Identify all pieces of the mounting bracket and mounting extension arm hardware and ancillary hardware (see *AP 7161 Hardware on page 8*).
- Mount the device with the black gore vent down.



- Mounting height for network devices should not exceed 30 to 35 feet. Mounting height should vary to accommodate the topography of the deployment area, foliage, and other obstructions.
- Devices can be deployed using any of the recommended outdoor deployment procedures.
- *Line of Sight* (LoS) guidelines should be given special consideration when deploying devices.

1.10 AP 7161 Hardware Overview

AP 7161 models can be purchased in a two or three radio configuration (see *AP 7161 Hardware on page 8*). Each model has two band unlocked radios that can operate across the 2.4GHz, 4.9GHz, and 5GHz bands, subject to country regulatory approval and outdoor/band use.

An AP 7161 must be installed by trained professionals familiar with RF planning and regulatory limits defined by the regulatory bodies of the country where the devices are being deployed. All common precautions for grounding and *Electrostatic Discharge* (ESD) protection should be observed during deployment and installation. AP 7161 Access Points must be installed such that no harmful interference results from device operation.

1.10.1 AP 7161 Ports and Connections

The AP 7161 Access Point has the following port designations:

- Antenna ports R1-A, B and C, R2-A, B and C, and R3-A and B
- Console port
- GE1/POE - LAN port
- GE2 - WAN port

The following sections describe the ports and connections for the AP 7161.

1.10.2 AP 7161 Antenna Connectors

AP 7161 two radio models (AP-7161-66040-US and AP-7161-66040-WR) are configured with six N type connectors to support two active WLAN data radios.

When mounting antennas to ports R1-A, R1-B, and R1-C, ensure that you have selected the appropriate band for the configured radio that uses ports R1-A, R1-B, and R1-C. In this instance, R1 ports relate to the software configured radio 1 settings.

When mounting antennas to connectors marked R2-A, R2-B and R2-C, these antenna ports relate to the software settings of radio 2. Care must be taken to provide the correct antenna for the operating band of each port.

AP 7161 three radio models (AP-7161-66S40-US and AP-7161-66S40-WR) are configured with eight N type connectors to support two active WLAN data radios and a dedicated sensor radio as the third.

As with the two radio models, R1 ports relate to the software configured radio 1 settings. When mounting antennas to connectors marked R2-A, R2-B and R2-C, the antenna ports relate to the software configured radio 2 settings. Care must be taken to provide the correct antenna for the operating band of each port.

Ports R3-A and R3-B are reserved for the sensor radio. An appropriate multi band antenna should be mounted on the unit for sensor operation.

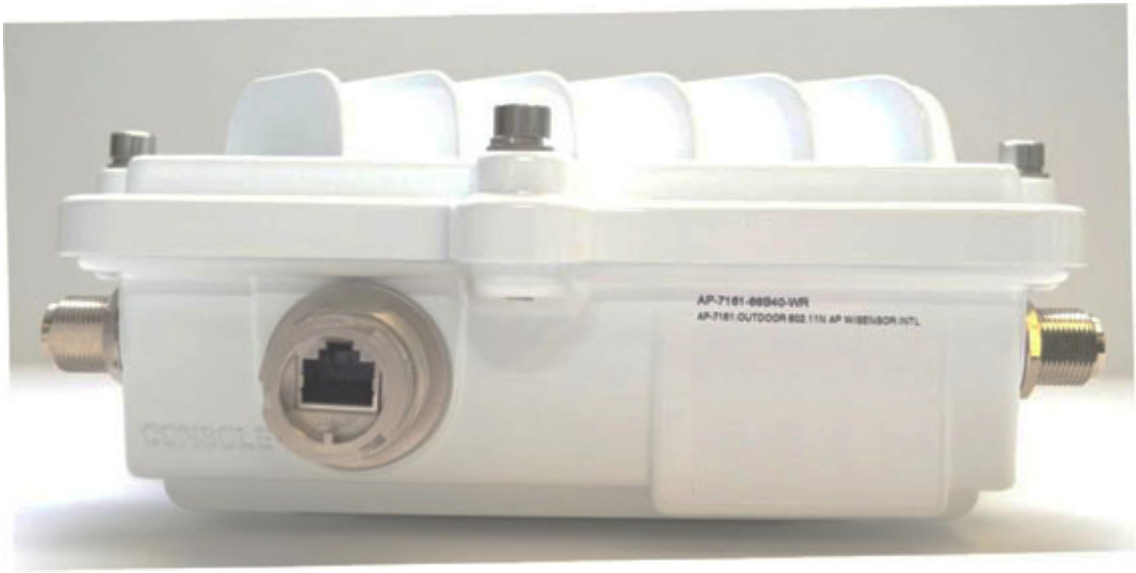
NOTE The sensor radio does not function as a WLAN data radio.

WARNING! Antenna ports where no antenna is mounted must be properly terminated using an approved IP67 terminator.

WARNING! All antenna connectors should be covered with weatherproofing tape.

1.10.3 AP 7161 Console, GE1/POE and GE2 Ports

The AP 7161 has Ethernet ports for external console, GE1/POE, and GE2 connections.To gain access to the ports you will need to remove the protective caps.



The Ethernet cable from the PoE device (if used) connects to the GE1/POE port on the unit.

The GE2 port on the unit can be used if a second data connection for an external device (e.g. surveillance camera) is required. Ensure the GE2 WAN port has been configured to permit an attached external device during the configuration process.

When making connections using these ports, a properly rated RJ45 connector is required. One weatherproof RJ45 plug kit is provided with each Access Point. When connecting cables to the AP 7161 Ethernet ports, follow the instructions in the connector packaging and tighten the connectors to create a weatherproof seal. Shielded cables are required.

1.10.4 AP 7161 Grounding Screw

The grounding screw is located to the right of the GE1/POE port and above the GND symbol.

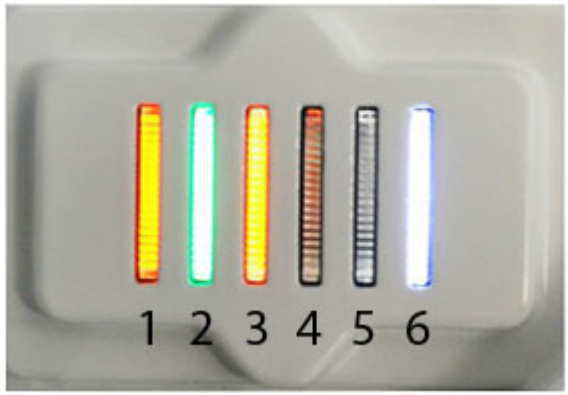
WARNING! The grounding cable for an AP 7161 **must** be at a minimum a #10 gauge wire cross section.

The grounding cable can be attached to the unit using one of three recommended methods. Using an 8mm socket and driver:

- Loosen the grounding screw and insert the grounding cable into the hole below it. Tighten the grounding screw to 30 inch pounds (lbf-in).
- Loosen the grounding screw and wind the grounding cable around the screw. Tighten the grounding screw to 30 inch pounds (lbf-in).
- Attach a ring lug to the grounding cable and remove the grounding screw to attach the ring lug to the Access Point. Secure it to the unit by reinserting the grounding screw. Tighten the grounding screw to 30 inch pounds (lbf-in).

1.11 LED Indicators

The AP 7161 Access Point has six LEDs on the top of the Access Point housing. When the Access Point is positioned with the Motorola Solutions logo in the lower right corner, LED 1 is on the left and LED 6 is on the right.



The Access Point utilizes two different colored lights below each LED. Only one light displays within an LED at any given time. Every light within each LED is exercised during startup to allow the user to see if an LED is not functioning. The LEDs turn on and off while rotating in a circular pattern. Since two LEDs feed each light pipe, the pattern is from left to right (LEDs 1 through 6), then right to left (LEDs 6 through 1).

The top housing LEDs have the following display patterns and functionality:

1.11.1 Two Radio LEDs

A two radio model Access Point (P/N AP-7161-66040-US and AP-7161-66040-WR) has the following unique LED behavior:

LED 1 (Sensor)	**LED 2 (2.4 GHz)**	**LED 3 (5 GHz)**	**LED 4 (GE2/WAN)**	**LED 5 (GE1/LAN)**	**LED 6 (System)**
Not Used	Blinking **Emerald** indicates 802.11b/g/n activity. Solid **Emerald** indicates a radio is present but not configured.	Blinking **Amber** indicates 802.11a/n activity. Solid **Amber** indicates a radio is present but not configured.	LED **Off** indicates the port is not connected. Blinking **Green** indicates normal operation. Rapidly blinking **Yellow** indicates a port error.	LED **Off** indicates the port is not connected. Blinking **Green** indicates normal operation. Rapidly blinking **Yellow** indicates a port error.	Solid **Red** indicates diagnostic mode. Blinking **Red** at 1 second interval indicates POST failure. Solid **White following diagnostic mode** indicates booting. Blinking **Red** and **White** at 1 second interval indicates “no adoption”. Solid **White** indicates normal operation.

WARNING! If LED 6 remains blinking **Red** for longer than 10 minutes, cycle the power to the unit. If the condition persists, contact the Motorola Solutions support center.

1.11.2 Three Radio LEDs

A three radio model Access Point with sensor (P/N AP-7161-66S40-US and AP-7161-66S40-WR) has the following unique LED behavior:

LED 1 (Sensor)	**LED 2 (2.4 GHz)**	**LED 3 (5 GHz)**	**LED 4 (GE2/WAN)**	**LED 5 (GE1/LAN)**	**LED 6 (System)**
Blinking **Emerald** and **Amber** at 2 second interval indicates a radio is present but not connected to a server. Solid **Amber** indicates a radio is present and connected to a server.	Blinking **Emerald** indicates 802.11b/g/n activity. Solid **Emerald** indicates a radio is present but not configured.	Blinking **Amber** indicates 802.11a/n activity. Solid **Amber** indicates a radio is present but not configured.	LED **Off** indicates the port is not connected. Blinking **Green** indicates normal operation. Rapidly blinking **Yellow** indicates a port error.	LED **Off** indicates the port is not connected. Blinking **Green** indicates normal operation. Rapidly blinking **Yellow** indicates a port error.	Solid **Red** indicates diagnostic mode. Blinking **Red** at 1 second interval indicates POST failure. Solid **White following diagnostic mode** indicates booting. Blinking **Red** and **White** at 1 second interval indicates "no adoption". Solid **White** indicates normal operation.

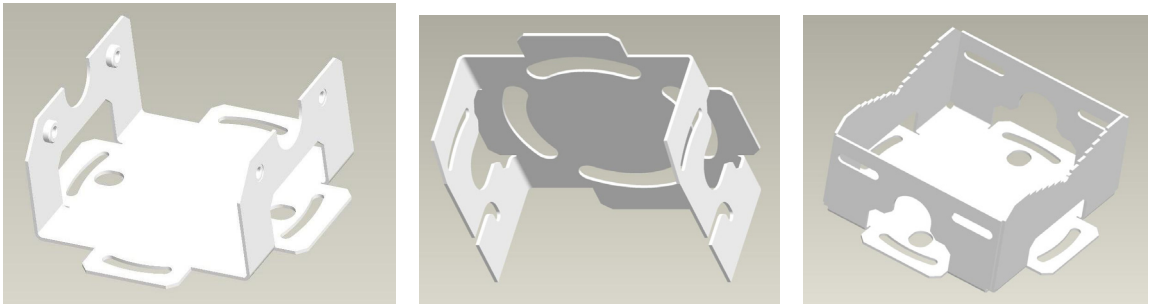
2 AP 7161 Hardware Mounting and Installation

It is recommended to use the AP 7161 mounting bracket kit (KT-147407-01) for most deployments. When a standoff distance is required for a pole mounted or wall mounted installation, use the extension arm kit (KT-150173-01).

The following sections detail the installation procedure for deploying an AP 7161 Access Point.

2.1 Mounting Bracket Kit

The AP 7161 mounting bracket kit (KT-147407-01) includes the Access Point bracket (left), angle adapter bracket (center), and pole mount bracket (right) sections:

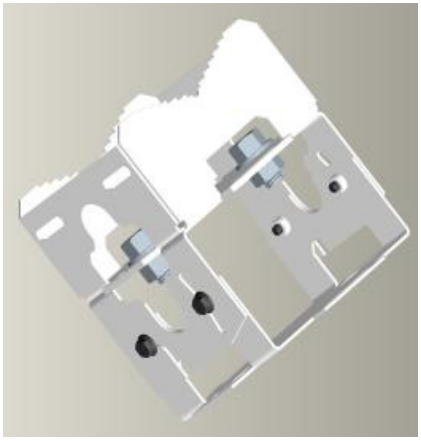


The Access Point bracket and angle adapter bracket can be rotated (plus or minus 15 degrees) and tilted (up to 45 degrees) to orient the unit for optimal positioning.

The following ancillary hardware to assemble the mounting bracket sections is included in the kit:

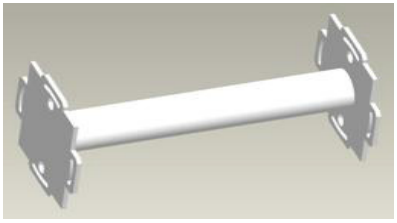
Description	Quantity
M6 serrated hex flanged screws	8
1/2 inch hex head nut	2
1/2 inch x 3/4 inch hex head bolt	2

A torque wrench or ratchet with a 10mm adapter, or an adjustable wrench, can be used to assemble the mounting brackets. A finished assembly of the mounting bracket kit is shown below. Assembly during deployment may differ to achieve the required angle and rotation.

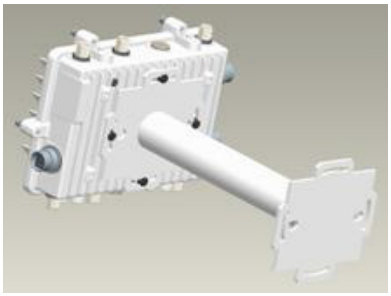


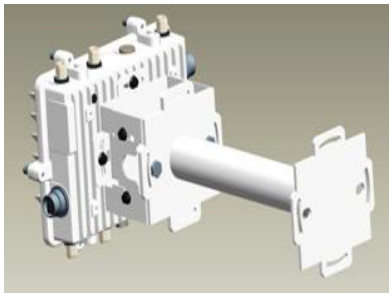
2.1.1 Extension Arm Kit

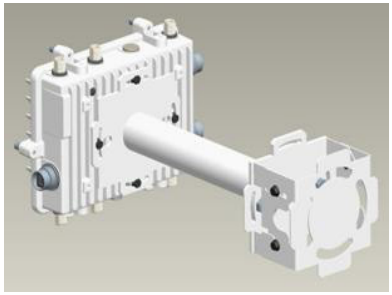
When mounting an AP 7161 on poles more than 3 inches in diameter, use the extension arm kit (KT-150173-01) to provide a minimum standoff distance of twelve inches to avoid interference with the antennas.

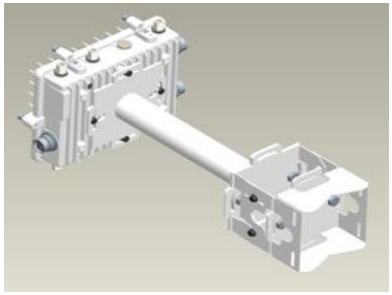


The extension arm kit can also be used in combination with the any of the brackets from the mounting bracket kit.









The following ancillary hardware to attach the extension arm to the mounting bracket kit sections is included in the extension arm kit:

Description	Quantity
1/2 inch hex head nut	2
1/2 inch x 3/4 inch hex head bolt	2

2.2 Pole Mounted Installations

The mounting hardware kit and extension arm can be used in various combinations to properly install the AP 7161 on a pole. For poles of up to 3 inches in diameter, attach the pole mount bracket of the mounting hardware kit at the desired position on the pole using band clamps up to 3/4 inch width, or a 1/2 inch x 4 inch wide U-bolt and nuts. For poles greater than 3 inches in diameter, attach the pole mount bracket using band clamps.

CAUTION Always mount the AP 7161 with the black gore vent facing down.

NOTE The U-bolt and band clamps are not included in the mounting bracket kit.

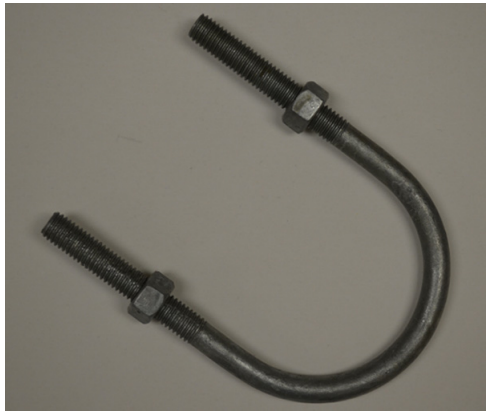
NOTE Use of the extension arm is recommended for installations on poles greater than 3 inches in diameter.

2.2.1 Vertical Pole Mount

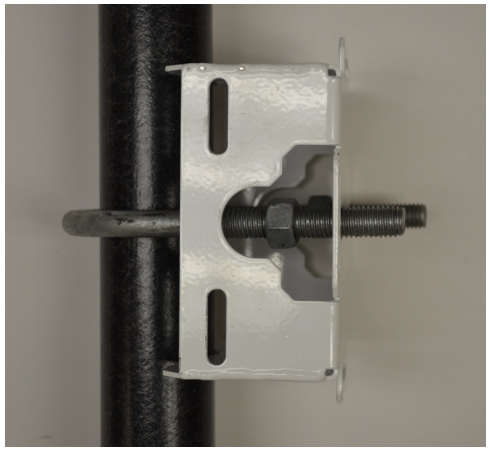
Use the following procedure for vertical pole mount installations. The extension arm is recommended when mounting the Access Point to poles greater than 3 inches is diameter.

For poles up to 3 inches in diameter when using a U-bolt:

1. Thread two 1/2 inch nuts onto the U-bolt.

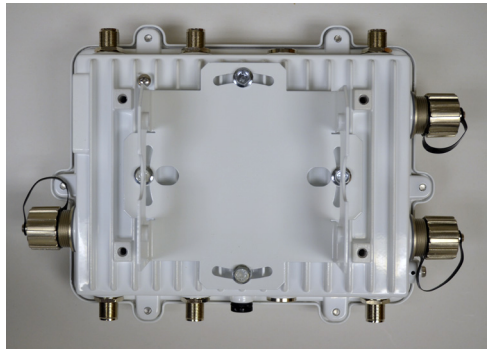


2. Position the U-bolt on the pole and place the pole mount bracket section on the U bolt. Adjust the two 1/2 inch inner nuts until the pole mount bracket section is against the pole and the U-bolt can be secured tightly to the pole at the desired mounting location.

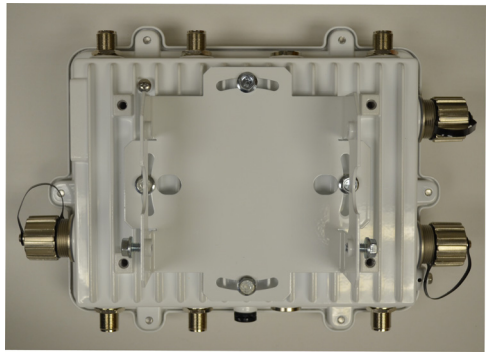


3. Place the angle adapter bracket section on the U-bolt with the open slot connections on the bottom and align it with the pole mount section. Attach with two 1/2 inch nuts. Tighten all nuts to 300 inch pounds (lbf-in).

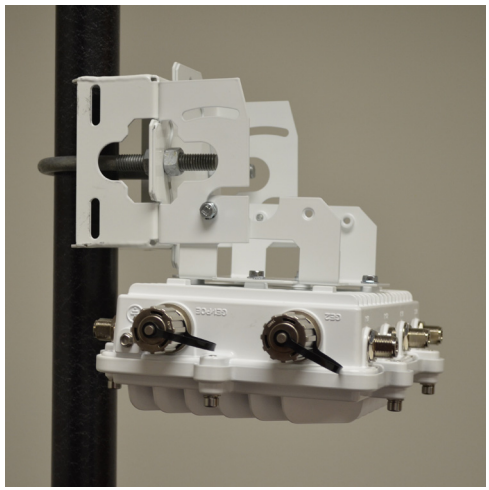
4. Position the Access Point bracket section so that the bottom of the section with the straight (not bevel cut) side is oriented toward the bottom side of the AP with the gore vent. Using a torque wrench or a ratchet and a 10mm socket, or an adjustable wrench, attach (but don't tighten) the Access Point bracket section to the AP 7161 with the four M6 flange screws



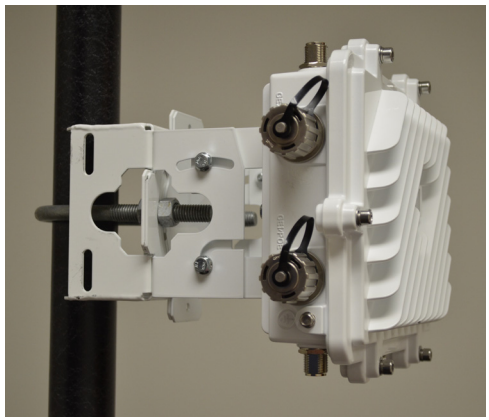
5. Insert two M6 hex flange screws into the bottom holes on the sides of the Access Point bracket section.



6. With the Access Point positioned so that the gore vent is facing down, insert the two M6 hex flange screws in the bottom holes on the sides of the Access Point bracket section into the open slot connections on the bottom of the angle adapter bracket section.



7. Rotate the Access Point bracket section upward and align the top holes on the sides with the top holes on the angle adapter bracket section. Insert two M6 hex flange screws into the top holes on the angle adapter bracket section.

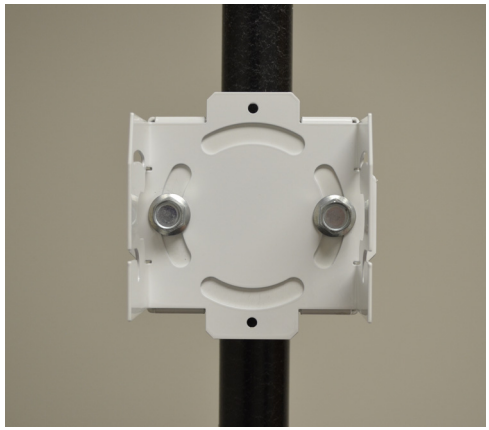


8. Use a torque wrench or a ratchet and a 10mm socket, or an adjustable wrench, to finish attaching the Access Point bracket section to the angle adapter bracket section with the M6 hex flange screws in the open slot connections and the top holes on the angle adapter bracket section. Do not tighten the screws until all rotation and tilt adjustments are complete.
9. To adjust the position of the Access Point, rotate the Access Point bracket section (plus or minus 15 degrees) and tilt the angle adapter bracket section (up to 45 degrees).
10. Tighten all hex flange screws to 60 inch pounds (lbf-in).

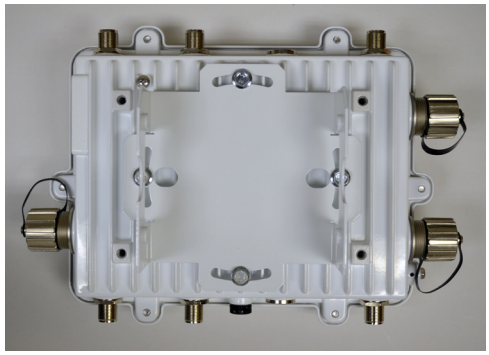
For mounting with band clamps:

1. Attach the pole mount bracket section at the desired mounting location using band clamps.

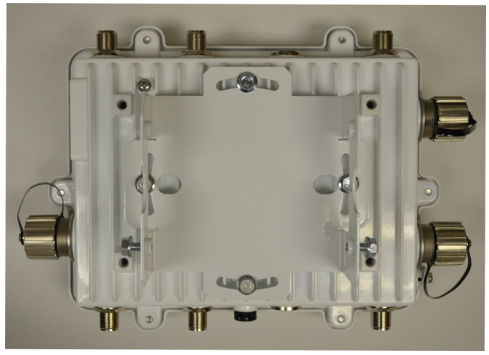
2. With the angle adapter bracket section positioned so that the open connector slots are on the bottom, attach the angle adapter bracket section to the pole mount bracket section using two 1/2 inch bolts and nuts. Tighten the nuts to 30 inch pounds (lbf-in).



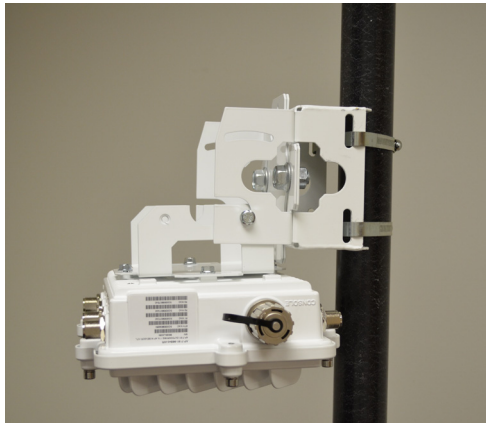
3. Position the Access Point bracket section so that the bottom of the section with the straight (not bevel cut) sides is oriented toward the bottom side of the AP with the gore vent. Using a torque wrench or a ratchet and a 10mm socket, or an adjustable wrench, attach (but don't tighten) the Access Point bracket section to the AP 7161 with the four M6 hex flange screws.



4. Insert two M6 hex flange screws into the bottom holes on the sides of the Access Point bracket section.



5. With the Access Point positioned so that the gore vent is facing down, insert the two M6 hex flange screws in the bottom holes on the sides of the Access Point bracket section into the open slot connections on the bottom of the angle adapter bracket section.



6. Rotate the Access Point bracket section upward and align the top holes on the sides with the top holes on the angle adapter bracket section. Insert two M6 hex flange screws into the top holes on the angle adapter bracket section.

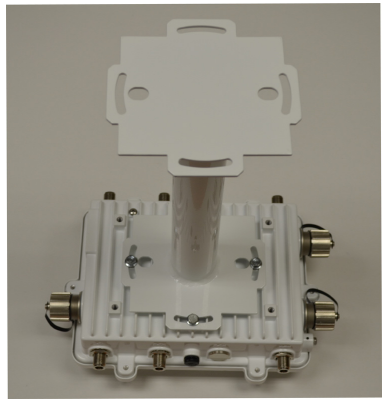
7. Use a torque wrench or a ratchet and a 10mm socket, or an adjustable wrench, to finish attaching the Access Point bracket section to the angle adapter bracket section with the M6 hex flange screws in the open slot connections and the top holes on the angle adapter bracket section. Do not tighten the screws until all rotation and tilt adjustments are complete.
8. To adjust the position of the Access Point, rotate the Access Point bracket section (plus or minus 15 degrees) and tilt the angle adapter bracket section (up to 45 degrees).
9. Tighten all hex flange screws to 60 inch pounds (lbf-in).

To use the extension arm with the mounting hardware kit:

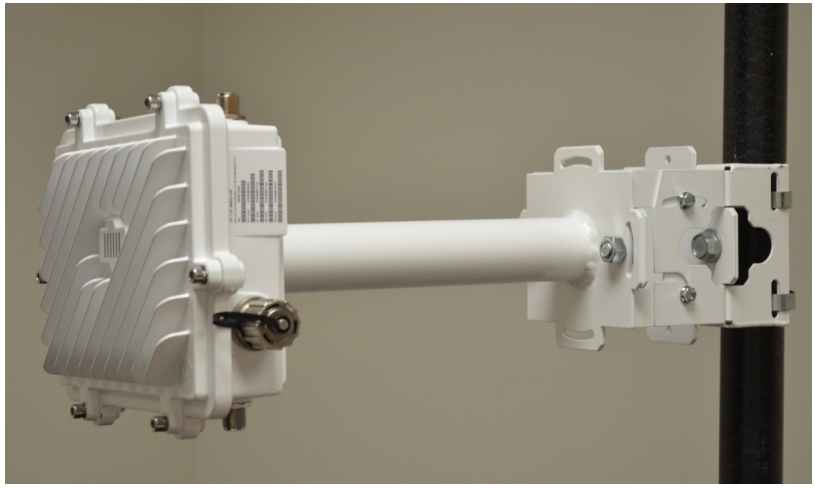
1. Attach the pole mount section at the desired mounting location using a U-bolt or band clamps.

2. Complete the steps for assembling and positioning the mounting bracket sections for poles less than or greater than 3 inches. See *Vertical Pole Mount on page 26*.

3. Using a torque wrench or a ratchet and a 10mm socket, or an adjustable wrench, attach the extension arm to the Access Point bracket section with four M6 hex flange screws. The two oval holes must be positioned on the short sides of the Access Point. Tighten the hex flange screws to 60 inch pounds (lbf-in) the unit.



4. With the Access Point positioned so that the gore vent is facing down, attach the extension arm to the Access Point bracket section with two 1/2 inch bolts and nuts. Tighten the nuts to 30 inch pounds (lbf-in).



An example of using the extension arm with only the pole mount bracket is shown below:

2.2.2 Wall Mounted Installations

For wall mounted installations, use only the Access Point bracket section and angle adjust bracket section if required.

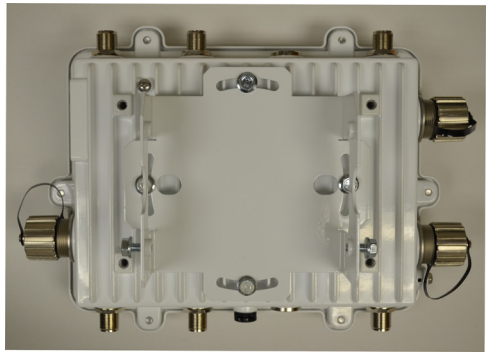
CAUTION Always mount the AP 7161 with the black gore vent facing down.

NOTE The U-bolt and band clamps are not included in the mounting bracket kit.

NOTE The lag bolts are not included in the mounting bracket kit.

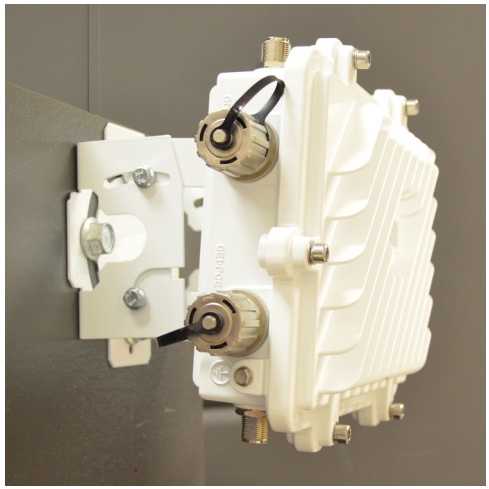
1. With the open slot connections facing down, attach the angle adjust bracket section at the desired mounting location using four #10/32 lag bolts.

2. Using a torque wrench or a ratchet and a 10mm socket, or an adjustable wrench, attach (but don't tighten) the Access Point bracket section to the AP 7161 with four M6 hex flange screws and insert two M6 hex flange screws into the bottom holes on the sides of the Access Point bracket section.



3. With the Access Point positioned so that the gore vent is facing down, insert the two M6 hex flange screws in the bottom holes on the sides of the Access Point bracket section into the open slot connections on the bottom of the angle adapter bracket section. Rotate the Access Point bracket section upward and

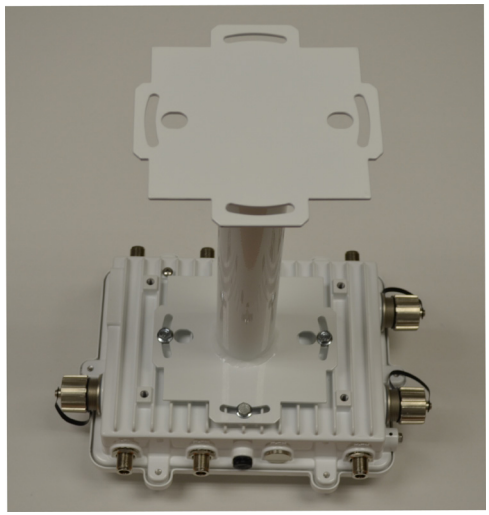
align the top holes on the sides with the top holes on the angle adapter bracket section. Insert two M6 hex flange screws into the top holes on the angle adapter bracket section.



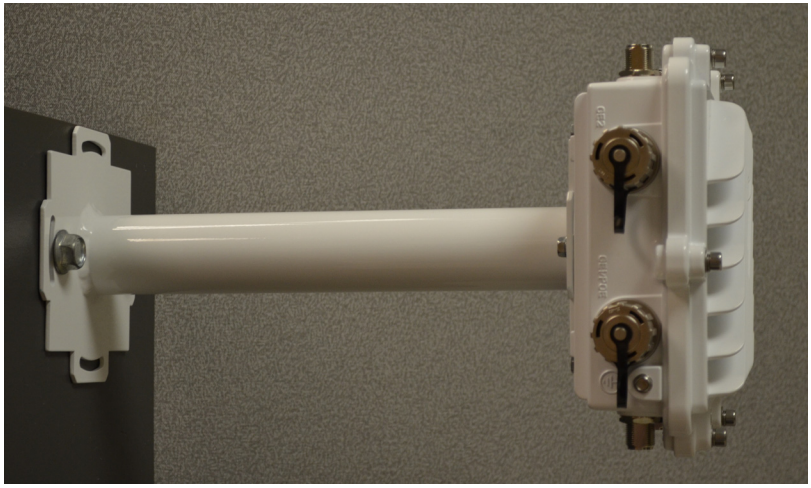
4. Use a torque wrench or a ratchet and a 10mm socket, or an adjustable wrench, to finish attaching the angle adapter bracket section to the Access Point bracket section with the four M6 hex flange screws in the open slot connections and the top holes on the angle adapter bracket section. Do not tighten the screws until all rotation and tilt adjustments are complete.
5. To adjust the position of the Access Point, rotate the Access Point bracket section (plus or minus 15 degrees) and tilt the angle adapter bracket section (up to 45 degrees).
6. Use a torque wrench or a ratchet and a 10mm socket, or an adjustable wrench, to tighten all screws when all adjustments are complete.
7. Tighten all hex flange screws to 60 inch pounds (lbf-in).

To use only the extension arm:

1. Using a torque wrench or a ratchet and a 10mm socket, or an adjustable wrench, attach the extension arm to the Access Point with four M6 hex flange screws. The two oval holes must be positioned on the short sides of the Access Point. Tighten the hex flange screws to 60 inch pounds (lbf-in).



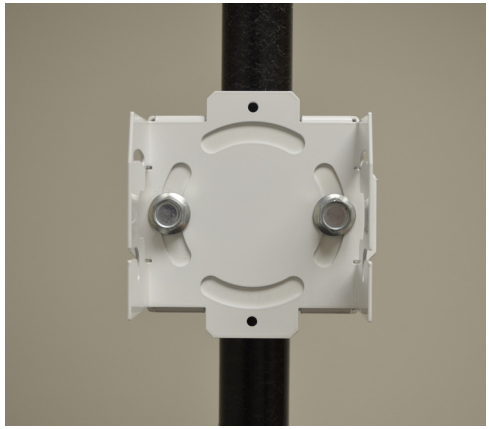
2. Attach the extension arm directly to the wall with lag bolts for other appropriate fasteners.



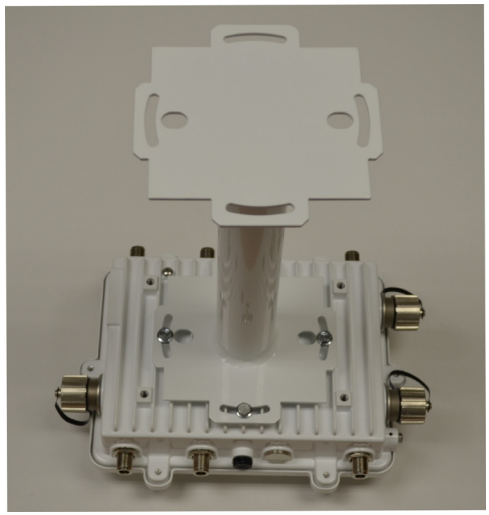
To use the extension arm with the mounting hardware kit:

1. With the open slot connections facing down, attach the angle adjust bracket section at the desired mounting location using four #10/32 lag bolts.

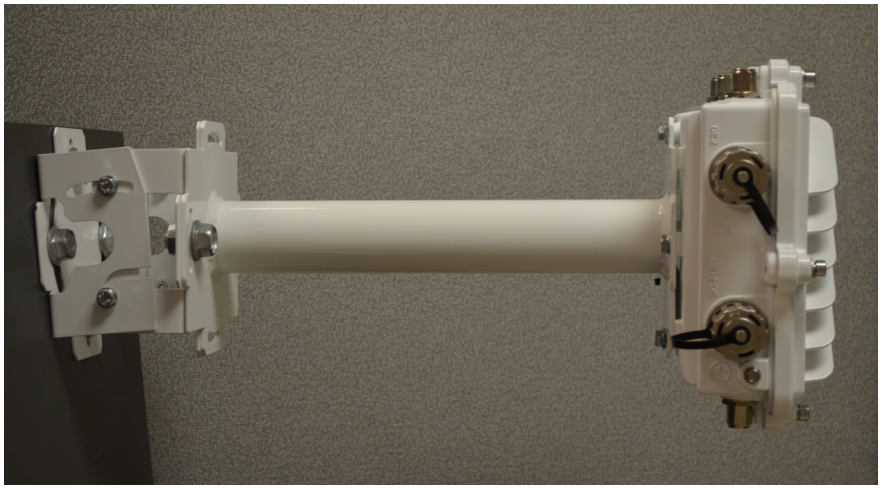
2. Complete the steps for assembling and positioning the angle adapter bracket and Access Point bracket sections outlined above. See *Vertical Pole Mount on page 26*.



3. With the Access Point positioned so that the gore vent is facing down, attach the extension arm to the Access Point using four M6 hex flange screws. The two oval holes must be positioned on the short sides of the Access Point. Tighten the hex flange screws to 60 inch pounds (lbf-in).



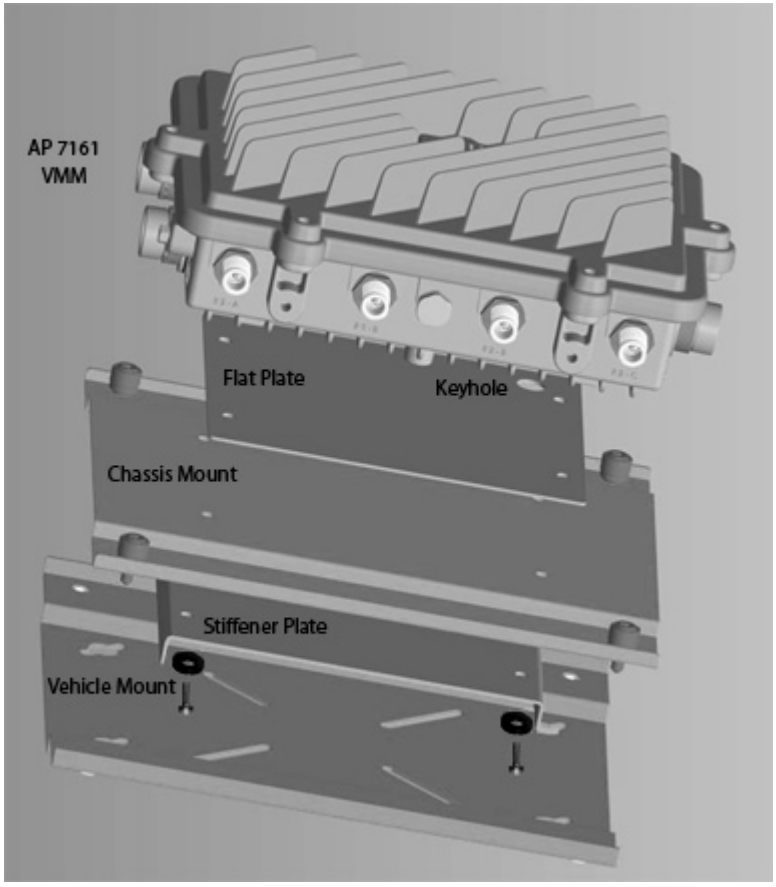
4. With the Access Point positioned so that the gore vent is facing down, attach the extension arm to the Access Point bracket section with two ½ inch bolts and nuts. Tighten bolts to 300 inch pounds (lbf-in).



2.3 AP 7161 VMM Mounting and Installation

The AP 7161 *Vehicle Mounted Modem* (VMM) is a software enabled profile within the WiNG 5 architecture that uses the same hardware as the AP 7161 Access Point infrastructure models (see *AP 7161 Hardware*).

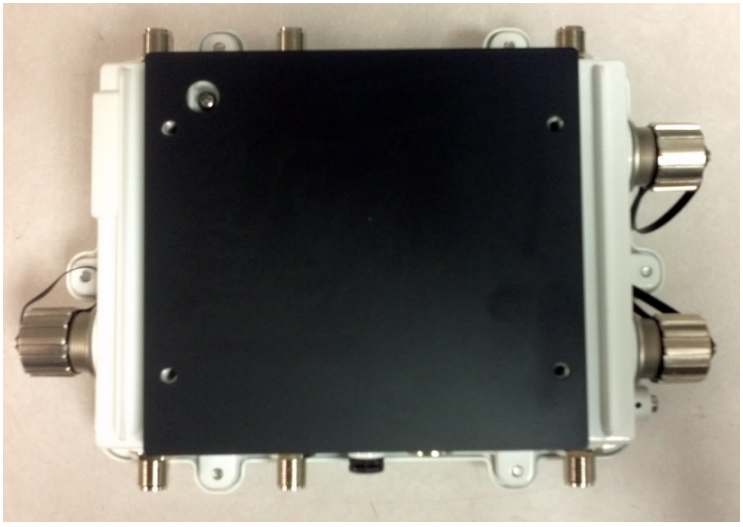
An AP 7161 Access Point operating as a VMM can be permanently mounted in a vehicle. It provides mesh backhaul access to a mesh infrastructure network to connect mobile data terminals, laptop computers, or any other device that has either an Ethernet or 802.11 wireless capability. The VMM operates on *Power over Ethernet* (PoE) and is rugged enough for installation in commercial and public safety vehicles for mobile deployments. It is recommended to use the AP 7161 vehicle mount kit (KT-158767-01) for mobile deployments.



To install the AP 7161 Access Point VMM:

1. Position the AP 7161 VMM upside down with the eight screw holes facing upwards.

2. Put the flat plate on top of the VMM. Align the key hole and four screw holes on the flat plate with the philips screw head and four screw holes on the VMM.

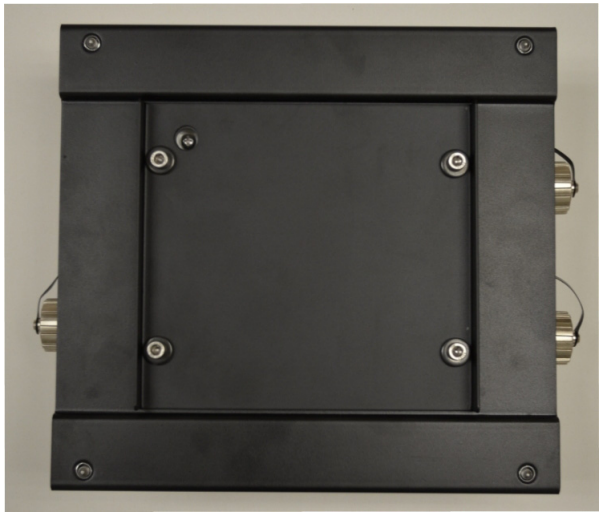


3. Put the chassis mount on the flat plate with the key hole and four screw holes aligned.

NOTE The screw heads on the chassis mount should be facing down.

4. Put the stiffener plate on the chassis mount with the key hole and four screw holes aligned.

5. Insert four screws with washers through the holes of the three plates and into the screw holes on the bottom of the VMM.



6. Using a 5mm allen wrench or box wrench, tighten the screws to 150 inch pounds (lbf-in).
7. Set the VMM and top bracket sub-assembly aside
8. Locate the mount point position for the VMM in the vehicle. Ensure there is sufficient clearance for cables and antennas. The surface should be metal (1.0 mm minimum thickness), hard plastic or plywood, and capable of supporting the weight of the VMM and bracket assembly.
9. Attach the vehicle mount securely to the mount point with metal screws or bolts (not provided).
10. Securely attach the AP 7161 top bracket sub-assembly to the vehicle mount with the four pre-installed thumb screws. Tighten the screws to 90 inch pounds (lbf-in) using a philips screwdriver or pliers.
11. Attach three RP-SMAF adaptors (part number 25-90263-02R) to the N connectors on the active mobile radio on the VMM. Radio 1 ports are labeled R1-A, R1-B, and R1-C. Radio 2 ports are labeled R2-A, R2-B, and R2-C.
12. Attach the antennas to the adaptors for each radio to be enabled.
13. Connect the CAT5E cable providing power to the RJ45 port labeled GE1/POE.

WARNING! Connecting power to any other port could damage the unit.

14. Select an Access Point Mode from the available options.

2.4 AP 7161 Power Options Using Power over Ethernet

Power over Ethernet (PoE) is the power source for an AP 7161 Access Point. For optimal performance, an AP 7161 can be powered by the following Motorola Solutions injectors and RFS controllers that support 802.AT PoE.

For installations requiring an outdoor PoE injector, the following Motorola Solutions options are recommended:

- AP-PSBIAS-7161-US
- AP-PSBIAS-7161-WW

The AP-PSBIAS-7161 is a 1-Port 802.3at PoE Gigabit Ethernet injector. The injector is IP66 rated for outdoor deployments when used with the weatherproof kit supplied.

There are two power cord options for the AP-PSBIAS-7161 models. The AP-PSBIAS-7161-US comes equipped with a cable with a standard three prong power plug. This plug can be removed by the installer if required when connecting to an AC source. The AP-PSBIAS-7161-WW comes equipped with a cable with open leads. Mounting kits are not supplied (see *Outdoor PoE Hardware and Mounting Accessories on page 11* for mounting kit part numbers).

NOTE Product installation and mounting instructions are provided with the outdoor power injector. Refer to the *AP-PSBIAS-7161 Install Guide*.

If located within 100 meters of the controller and a PoE port is available, the AP 7161 Access Point can also be connected directly to one of the following Motorola Solutions controllers:

- RFS4000
- RFS6000
- RFS7000
- NX9000
- NX95xx

A standard CAT5E cable can be used to provide the connection to the AP 7161. The GE1/POE port on the AP 7161 is where the standard CAT5E cable will connect to the Access Point and use of the weatherproof RJ45 plug kit that comes with the unit will maintain a weatherproof seal for outdoor installation at the ethernet port.

If a CAT5E cable is used to connect the Access Point to an RFS controller through a building egress, a suitable lightning protection system should be considered. A professional installer should be consulted to identify an appropriate system.

CAUTION When using controllers, the total power limits for the AP 7161 must be considered. The two radio configuration draws less power than a three radio configuration. If sufficient power is not available, the AP 7161 software will disable the third radio and throttle back performance on all radio and Ethernet interfaces.

2.5 AP 7161 VMM Power Options

The AP 7161 *Vehicle Mounted Modem* (VMM) is a software enabled profile within the WiNG5 architecture that uses the same hardware as AP 7161 infrastructure models (see *AP 7161 Hardware on page 8*). As such, a mounted AP 7161 operating as a VMM within a vehicle or mobile asset requires a power source delivered via *Power over Ethernet* (PoE). The same requirements and guidelines for Access Point power are in force as noted in this installation manual. Refer to *Specifications on page 59* for operating voltage and operating current.

An AP 7161 operating as a VMM has the capability of being installed into a variety of vehicular and mobile environments. As such, a professional certified installation partner should be consulted on appropriate power sources and installation into a vehicle or mobile asset. Motorola Solutions does not provide a vehicular power source nor takes responsibility for any power solution design operated outside of the allowed specifications for power of an AP7161 running as a VMM.

CAUTION Exceeding these requirements can invalidate warranty.

The following table shows a number of potential power sources and corresponding industry options to power an AP 7161 VMM:

Potential Vehicular/Mobile Power Sources	Required Source
12V battery	DC-DC convertor or DC PoE injector
24V battery	DC-DC convertor or DC PoE injector
12V power plug	DC PoE injector with power plug adapter
AC invertor in vehicle	AC PoE injector
PoE switch in train or vehicle	Direct connection via CAT5E cable

3 Basic Access Point Configuration

Once the Access Point is installed and powered on, complete the following steps to get the device up and running and access management functions:

1. Attach an Ethernet cable from the Access Point to a controller with an 802.3af compatible power source or use the PWRS-14000-148R power supply to supply power to the AP 7181 (once fully cabled).

   If your host system is a DHCP server, an IP address is automatically assigned to the AP 7181 and can be used for device connection. However, if a DHCP server is not available, you'll need to derive the IP address from the AP MAC address. Using this method, the last two bytes of the MAC address become the last two octets of the IP address. For example:

   MAC address - 00:C0:23:00:F0:0A
   Zero-Config IP address - 169.254.240.10

   To derive the Access Point's IP address using its MAC address:

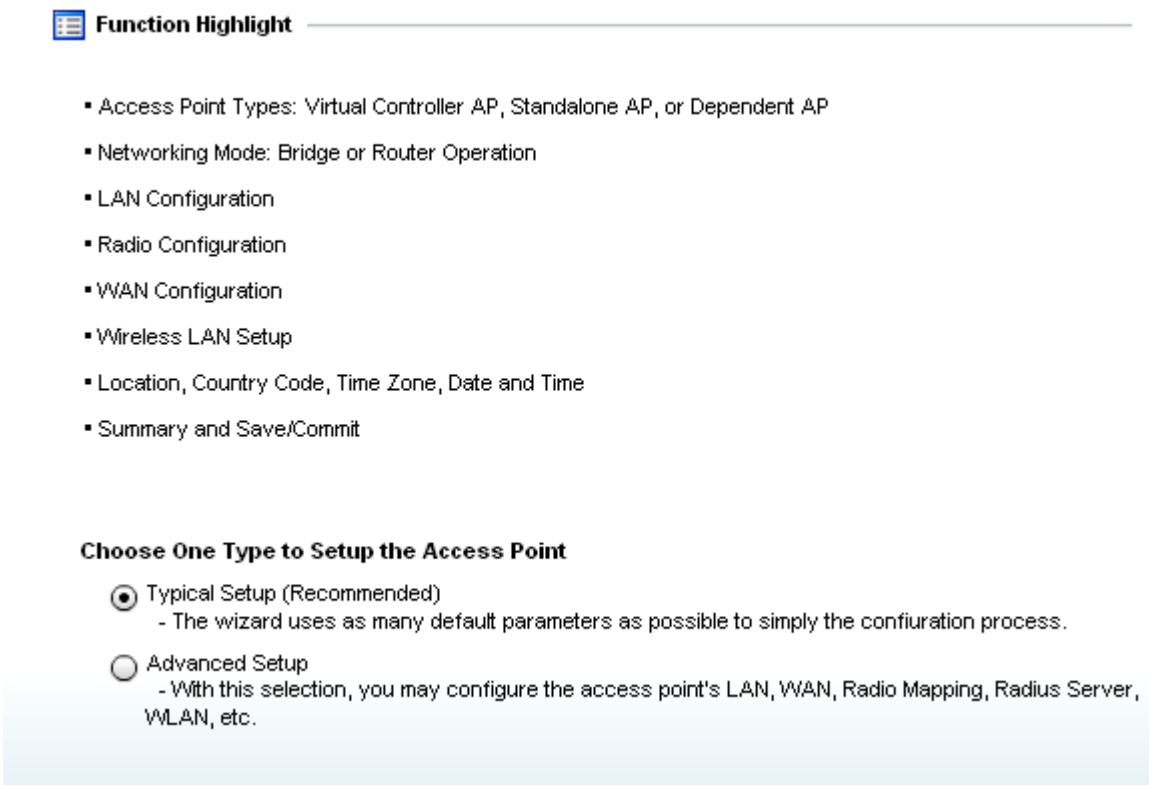
   a. Open the Windows calculator be selecting *Start* > *All Programs* > *Accessories* > *Calculator*. This menu path may vary slightly depending on your version of Windows.
   b. With the Calculator displayed, select *View* > *Scientific*. Select the **Hex** radio button.
   c. Enter a hex byte of the Access Point's MAC address. For example, F0.
2. Select the **Dec** radio button. The calculator converts F0 into 240. Repeat this process for the last Access Point MAC address octet.Point the Web browser to the Access Point's IP address. The following login screen displays:

3. Enter the default username ***admin*** in the **Username** field.
4. Enter the default password ***motorola*** in the **Password** field.
5. Click the **Login** button to load the management interface.

NOTE When logging in for the first time, you're prompted to change the password to enhance device security in subsequent logins.

NOTE If you get disconnected when running the wizard, you can connect again with the Access Point's actual IP address (once obtained) and resume the wizard.

6. If this is the first time the management interface has been accessed, the Initial Setup Wizard automatically displays.


Function Highlight
▪ Access Point Types: Virtual Controller AP, Standalone AP, or Dependent AP
▪ Networking Mode: Bridge or Router Operation
▪ LAN Configuration
▪ Radio Configuration
▪ WAN Configuration
▪ Wireless LAN Setup
▪ Location, Country Code, Time Zone, Date and Time
▪ Summary and Save/Commit
Choose One Type to Setup the Access Point
Typical Setup (Recommended)
- The wizard uses as many default parameters as possible to simply the confiuration process.
Advanced Setup
- With this selection, you may configure the access point's LAN, WAN, Radio Mapping, Radius Server, WLAN, etc.

NOTE The Initial Setup Wizard displays the same pages and content for each Access Point model supported. The only difference being the number of radios configurable by model, as an AP7131 model can support up to three radios, AP6522, AP6532, AP6562, AP8132 and AP7161 models support two radios and AP6511 and AP6521 models support a single radio.

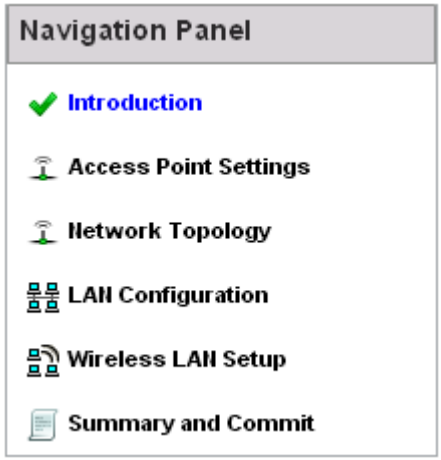
The Introduction screen displays the various actions that can be performed using the wizard under the **Function Highlight** field.

Use the **Choose One type to Setup the Access Point** field options to select the type of wizard to run. The **Typical Setup** is the recommended wizard. This wizard uses the default parameters for most of the configuration parameters and sets up a working network with the least amount of manual configuration.

The **Advanced Setup** wizard is for administrators who prefer more control over the different configuration parameters. A few more configuration screens are available for customization when the Advanced Setup wizard is used.

The first page of the *Initial Setup Wizard* displays the **Navigation Panel** and **Function Highlights** for the configuration activities comprising the Access Point's initial setup. This page also displays options to select the typical or advanced mode for the wizard.

The Navigation Panel for the Typical Setup Wizard displays the basic configuration options.



A green checkmark to the left of an item in the **Navigation Panel** defines the task as having its minimum required configuration set correctly. A red X defines a task as still requiring at least one parameter be defined correctly.

7. Select **Save/Commit** within each page to save the updates made to that page's configuration. Select **Next** to proceed to the next page listed in the Navigation Panel without saving your updates.

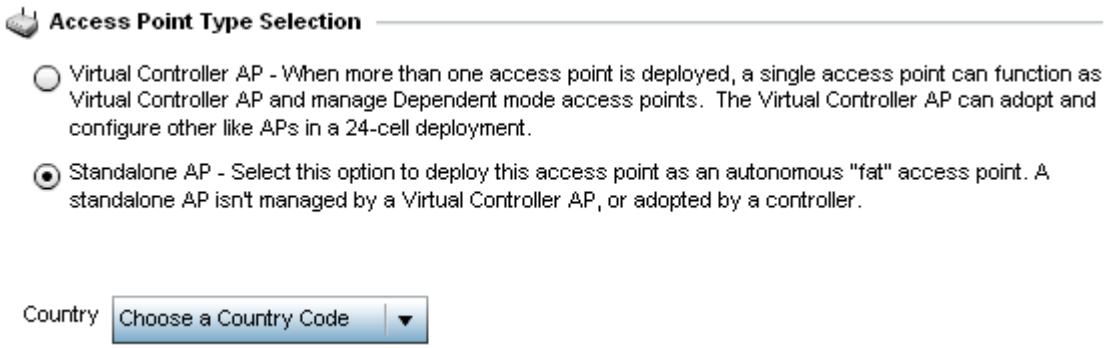
NOTE While you can navigate to any page in the navigation panel, you cannot complete the Initial AP Setup Wizard until each task in the Navigation Panel has a green checkmark.

For the purposes of this guide, use the **Typical Setup (Recommended)** option to simplify the process of getting the Access Point up and running quickly with a minimum number of changes to the Access Point's default configuration.

For information on using the Access Point's Advanced Setup option, refer to the *WiNG Access Point System Reference Guide* to familiarize yourself with the feature set supported by the WiNG operating system. The guide is available at http://supportcentral.motorolasolutions.com/support/product/manuals.do.

To configure the Access Point using the Typical Setup Wizard:

8. Select **Typical Setup** from the **Choose One type to Setup the Access Point** field on the Initial Setup Wizard.
9. The Typical Setup Wizard displays the **Access Point Settings** screen to define the Access Point's Standalone versus Virtual Controller AP functionality. This screen also enables selection of the country of operation for the Access Point.


Access Point Type Selection
Virtual Controller AP - When more than one access point is deployed, a single access point can function as a Virtual Controller AP and manage Dependent mode access points. The Virtual Controller AP can adopt and configure other like APs in a 24-cell deployment.
Standalone AP - Select this option to deploy this access point as an autonomous "fat" access point. A standalone AP isn't managed by a Virtual Controller AP, or adopted by a controller.
Country
Choose a Country Code

10. Select an **Access Point Type** from the following options:
    - *Virtual Controller AP* - When more than one Access Point is deployed, a single Access Point can function as a Virtual Controller AP. Up to 24 Access Points can be connected to, and managed by, a single Virtual Controller AP of the same Access Point model. These connected Access Points must be the same model as the Virtual Controller AP.
    - *Standalone AP* - Select this option to deploy this Access Point as an autonomous fat Access Point. A Standalone AP isn't managed by a Virtual Controller AP, or adopted by a controller.

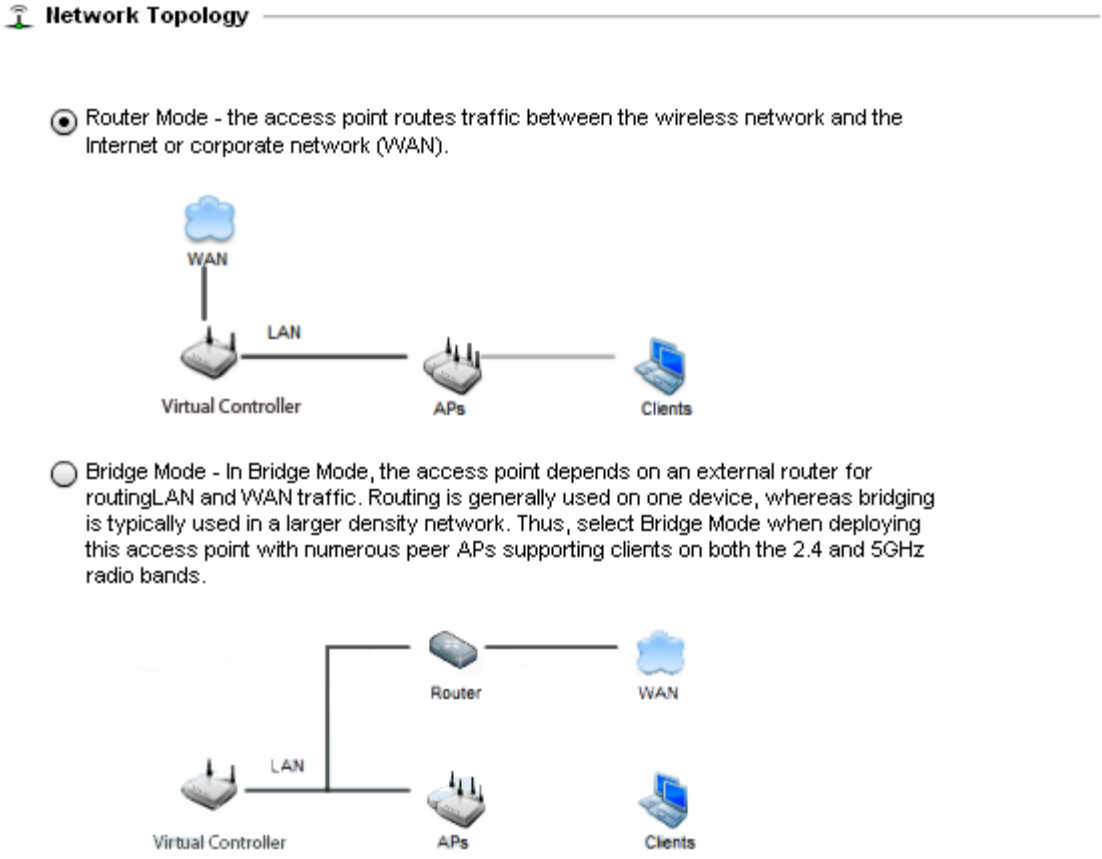
NOTE If wanting to adopt the Access Point to a controller or service platform, use the controller or service platform's resident UI to connect to the Access Point, provision its configuration and administrate the Access Point's configuration.

NOTE If designating the Access Point as a Standalone AP, Motorola Solutions recommends the Access Point's UI be used exclusively to define its device configuration, and not the CLI. The CLI provides the ability to define more than one profile and the UI does not. Consequently, the two interfaces cannot be used collectively to manage profiles without an administrator encountering problems.

11. Select the **Country Code** of the country where the Access Point is deployed. Selecting a proper country is a critical task while configuring the Access Point, as it defines the correct channels of operation and ensures compliance to the regulations of the selected country. This field is only available for the Typical Setup Wizard.

12. Select **Next** to set the Access Point's network mode.

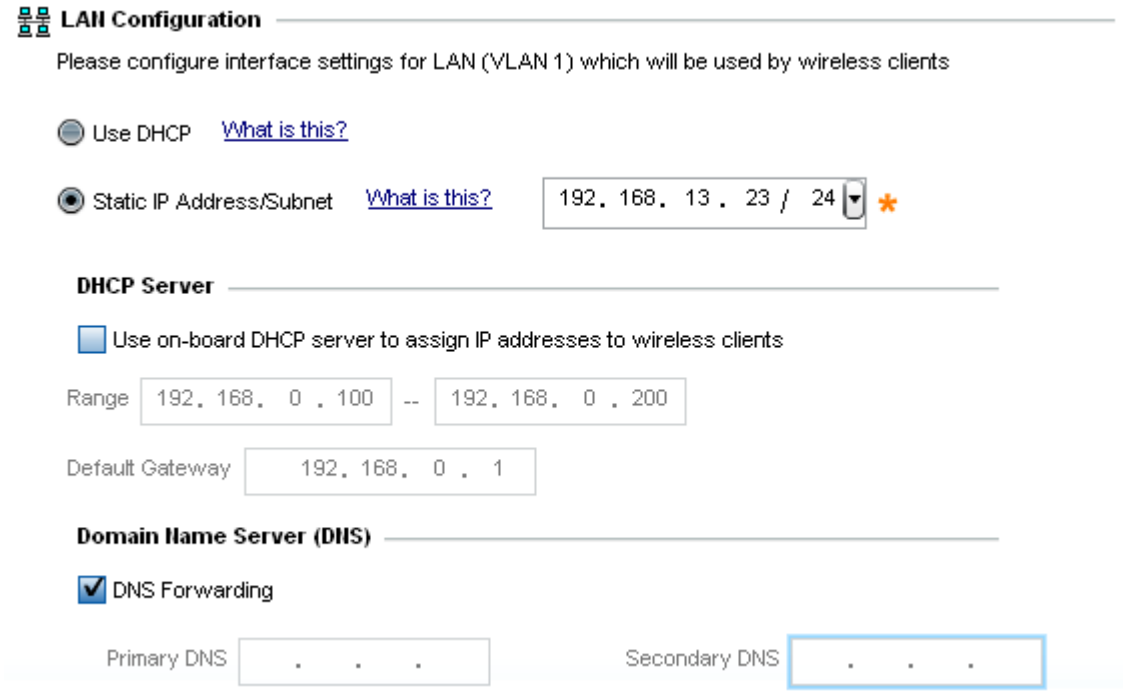
13. The Typical Setup Wizard displays the **Network Topology** screen to define how the Access Point handles network traffic.


Network Topology
Router Mode - the access point routes traffic between the wireless network and the Internet or corporate network (WAN).
WAN
LAN
Virtual Controller
APs
Clients
Bridge Mode - In Bridge Mode, the access point depends on an external router for routingLAN and WAN traffic. Routing is generally used on one device, whereas bridging is typically used in a larger density network. Thus, select Bridge Mode when deploying this access point with numerous peer APs supporting clients on both the 2.4 and 5GHz radio bands.
Router
WAN
LAN
Virtual Controller
APs
Clients

14. Select an Access Point Mode from the available options.
    - *Router Mode* -In Router Mode, the Access Point routes traffic between the local network (LAN) and the Internet or external network (WAN). Router mode is recommended in a deployment supported by just a single Access Point.
    - *Bridge Mode* - In Bridge Mode, the Access Point depends on an external router for routing LAN and WAN traffic. Routing is generally used on one device, whereas bridging is typically used in a larger density network. Select Bridge Mode when deploying this Access Point with numerous peer Access Points supporting clients on both the 2.4GHz and 5GHz radio bands.

NOTE When Bridge Mode is selected, WAN configuration cannot be performed and the Typical Setup Wizard does not display the WAN configuration screen.

15. Select **Next**. The Typical Setup Wizard displays the **LAN Configuration** screen to set the Access Point's LAN interface configuration.


LAN Configuration
Please configure interface settings for LAN (VLAN 1) which will be used by wireless clients
Use DHCP
What is this?
Static IP Address/Subnet
What is this?
192. 168. 13 . 23 / 24
DHCP Server
Use on-board DHCP server to assign IP addresses to wireless clients
Range
192. 168. 0 . 100
--
192. 168. 0 . 200
Default Gateway
192. 168. 0 . 1
Domain Name Server (DNS)
DNS Forwarding
Primary DNS
Secondary DNS

16. Set the following DHCP and Static IP Address/Subnet information for the LAN interface:
    - *Use DHCP* - Select the checkbox to enable an automatic network address configuration using the Access Point's DHCP server.
    - *Static IP Address/Subnet* - Enter an IP Address and a subnet for the Access Point's LAN interface. If *Use DHCP* is selected, this field is not available. When selecting this option, define the following *DHCP Server* and *Domain Name Server (DNS)* resources, as those fields will become enabled on the bottom portion of the screen.
        - *Use on-board DHCP server to assign IP addresses to wireless clients* - Select the checkbox to enable the Access Point's DHCP server to provide IP and DNS information to clients on the LAN interface.
        - *Range* - Enter a starting and ending IP Address range for client assignments on the LAN interface. Avoid assigning IP addresses from x.x.x.1 - x.x.x.10 and x.x.x.255, as they are often reserved for standard network services. This is a required parameter.
        - *Default Gateway* - Define a default gateway address for use with the default gateway. This is a required parameter.

- *DNS Forwarding* - Select this option to allow a DNS server to translate domain names into IP addresses. If this option is not selected, a primary and secondary DNS resource must be specified. DNS forwarding is useful when a request for a domain name is made but the DNS server, responsible for converting the name into its corresponding IP address, cannot locate the matching IP address.
  - *Primary DNS* - Enter an IP Address for the main Domain Name Server providing DNS services for the Access Point's LAN interface.
  - *Secondary DNS* - Enter an IP Address for the backup Domain Name Server providing DNS services for the Access Point's LAN interface.

17. Select **Next.** The Typical Setup Wizard displays the **Wireless LAN Setup** screen to set the Access Point's Wireless LAN interface configuration.

18. Set the following WLAN1 Configuration parameters
    - *SSID* - Configure the SSID for the WLAN.
    - *WLAN Type* - Configure the encryption and authentication to use with this WLAN.
      - *No Authentication and No Encryption* - Configures a network without any authentication. This option also configures the network without encryption. This means that any data transmitted through the network is in plain text. Any device between end points can see the information transmitted. This is the least secure of all network configurations.
      - *Captive Portal Authentication and No Encryption* - Configures a network that uses a RADIUS server to authenticate users before allowing them on to the network. Once on the network, no encryption is used for the data being transmitted through the network. Select this option to use a Web page (either internally or externally hosted) to authenticate users before access is granted to the network.
      - *PSK authentication, WPA2 encryption* - Configures a network that uses PSK authentication and WPA2 encryption. Select this option to implement a pre-shared key that must be correctly shared between the Access Point and requesting clients using this WLAN.

19. Select **Next**. The Typical Setup Wizard displays the **RADIUS Server Configuration** screen if required.

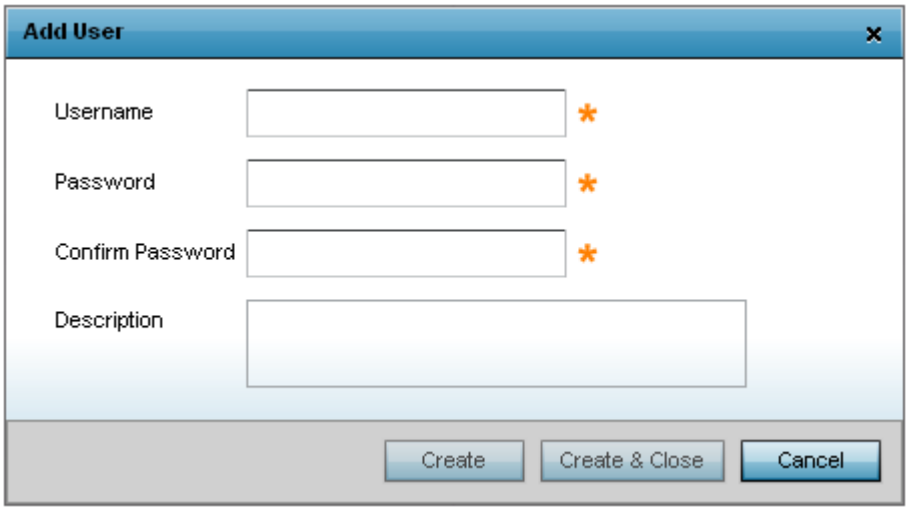
    Otherwise, the *Typical Setup Wizard* displays the **Summary and Commit** screen.

20. Use the **Radius Server Configuration** screen to configure the users for the onboard RADIUS server. Use the screen to add, modify and remove RADIUS users.

Some WLANs require authentication using the on-board RADIUS server. User accounts must be added for all users that should be authorized by the server.

Username	Description

21. Select **Add User** to display the dialog to enter user information to add to the RADIUS server user database.

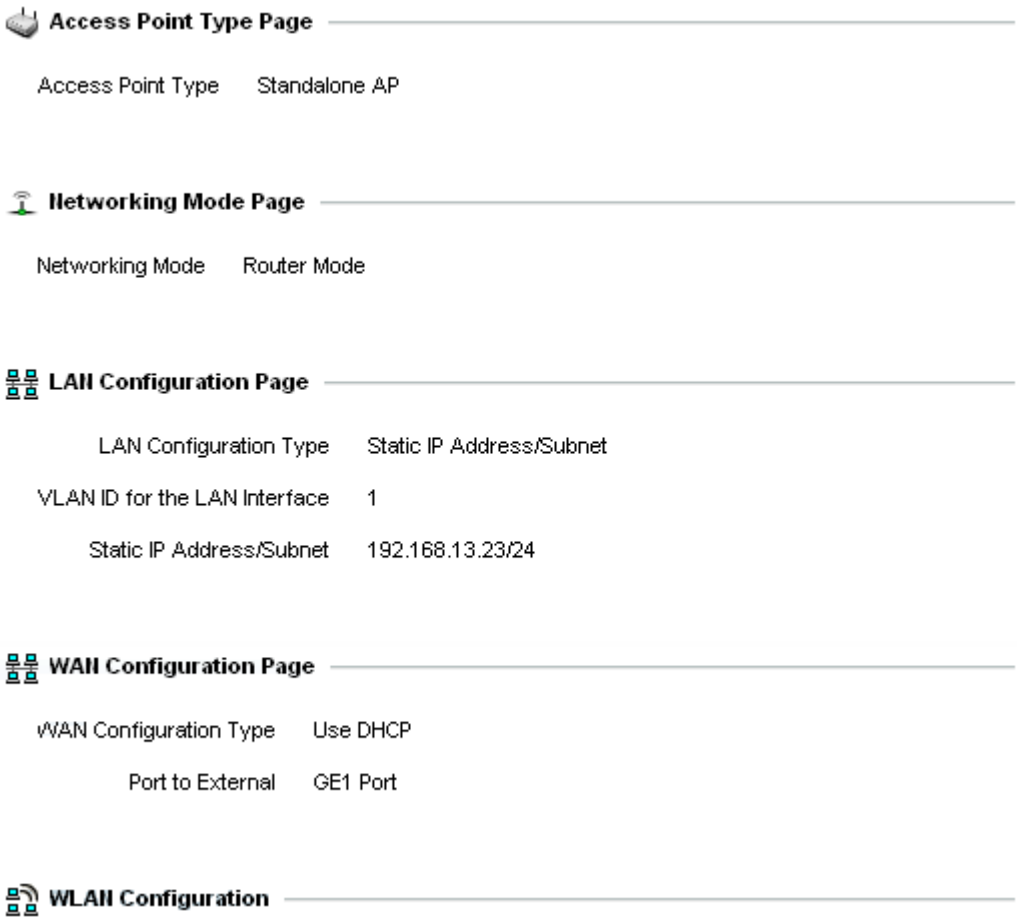


22. Enter the following user information:
    - *Username* - Provide a user name used to authenticate the user.
    - *Password* - Provide a password used to authenticate the user.
    - *Confirm Password* - Confirm the password by entering the same password as entered in the Password field.
    - *Description* - Provide a description to identify the user created in the RADIUS server database.
23. To create the entry in the RADIUS server database and add another user, select **Create**. To create the entry in the RADIUS server database and close the Add User dialog, select **Create & Close**.
24. Select **Modify User** on the RADIUS Server Configuration screen to modify information for an existing user from the RADIUS database. Highlight the user entry then select **Modify User**.

NOTE The *Username* cannot be modified with this dialog.

25. Select **Delete User** on the RADIUS Server Configuration screen to remove information for an existing user from the RADIUS database. Highlight the user entry and select **Delete User**.
26. Select **Confirm** on the dialog displayed. The entry for the user is removed from the RADIUS database.
27. To dismiss the dialog without adding, modifying or removing entries in the RADIUS server database, select **Cancel**.

28. Select **Next**. The Typical Setup Wizard displays the **Summary and Commit** screen to summarize the screens (pages) and settings updated using the Typical Setup Wizard.


Access Point Type Page
Access Point Type Standalone AP
Networking Mode Page
Networking Mode Router Mode
LAN Configuration Page
LAN Configuration Type Static IP Address/Subnet
VLAN ID for the LAN Interface 1
Static IP Address/Subnet 192.168.13.23/24
WAN Configuration Page
WAN Configuration Type Use DHCP
Port to External GE1 Port
WLAN Configuration

No user intervention or additional settings are required. Its an additional means of validating the Access Point's updated configuration before it's deployed. However, if a screen displays settings not intended as part of the initial configuration, then any screen can be selected again from within the Navigation Panel and its settings modified accordingly.

29. If the configuration displays as intended, select **Save/Commit** to implement these settings to the Access Point's configuration. If additional changes are warranted based on the summary, either select the target page from the **Navigational Panel**, or use the **Back** and **Next** buttons to scroll to the target screen.

3.1 Antenna Type Configuration

For AP 7161 to operate properly, the antenna type and antenna gain must be configured manually.

Select antenna type with following command:

ap71xx-XXXXXX (config-device-xx-xx-xx-xx-xx-xx-if-radio1)#service antenna-type ap7161-dipole

Select antenna gain with following command:

ap71xx-XXXXXX (config-device-xx-xx-xx-xx-xx-xx-if-radio1)# antenna-gain <units in dBi>

Select VMM antenna type (if available) with following command:

ap71xx-XXXXXX (config-device-xx-xx-xx-xx-xx-xx-if-radio1)# service antenna-type ap7161-vmm

These changes can also be made in the device profile configuration file.

NOTE For FCC and ETSI requirements, set the 2.4GHz antenna gain to 8 dBi and set the 5GHz antenna gain to 10 dBi.

3.2 Automatic Channel Select Override

Under certain conditions (e.g. the presence of a 40 MHz channel intolerant client or a legacy device on the extension channel), a radio which has been configured for 40 MHz channel operation may automatically select the 20 MHz channel. To override or restore automatic channel selection, use the following commands:

ap71xx-XXXXXX (config-device-xx-xx-xx-xx-xx-xx-if-radio1)#service ignore-ch-width-mgmt

ap71xx-XXXXXX (config-device-xx-xx-xx-xx-xx-xx-if-radio1)#no service ignore-ch-width-mgmt

This change can also be made in the device profile configuration file.

4 Specifications

4.1 Hardware Specifications

Operating Voltage	36-57 VDC
Operating Current	Not to exceed 750 mA@48 VDC
Power In (PoE)	PoE support inbound power - 802.3AT on GE1/POE port
Ethernet Ports	2 Gigabit Ethernet ports
Dimensions (unit) mounted	28.1cm W x 21.8cx H x 9.4cm D (11.1" W x 8.6" H x 3.7" D)
Weight (Unit)	6.4 lbs / 2.9 Kg
Mounting	Adaptable mounting kit for pole and wall deployments with optional extension arm accessory
LED	6 top mounted weatherized LEDs with multifunction read
Uplink	2 Gigabit Ethernet Ports (GE1/POE, GE2) autosensing
Antenna Connectors	Outdoor rated N-Type connectors
Console Port	Outdoor rated RJ45 console port
Hardware Reset	External hardware reset button
Multi Band Security Sensor	Outdoor 24x7 Wireless Intrusion Prevention System (IPS)/Assurance Sensor (SKU AP-7161-66S40-US, AP-7161-66S40-WR)

4.2 Environmental Specifications

Operating Temperature	-40 to +70 degrees celsius
Storage Temperature	-40 to +85 degrees celsius
Operating Humidity	5-95 percent
Operating Altitude	8,000 feet
Storage Altitude	30,000 feet
Electrostatic Discharge	EN61000-4-2. Air +/-15kV, Contact +/-8kV
Enclosure	Outdoor IP67 rated, corrosion resistant enclosure ASTM B117 salt, fog, and rust resistance

Wind Ratings	150 mph * (unit bracket measurement)
Operational Shock	IEC60721-3-4, Class 4M3, MIL STD 810F
Operational Vibration	IEC60721-3-4, Class 4M3

4.3 Radio Specifications

Network Standards	IEEE 802.11 a/b/g/n, 802.11e, 802.11i, WPA2, WMM, and WMM-UAPSD
Supported Data Rates	802.11b/g:1, 2, 5.5, 11, 6, 9, 12, 18, 24, 36, 48 and 54 Mbps 802.11a: 6, 9, 12, 18, 24, 36, 48 and 54 Mbps 802.11n: MCS 0-15 up to 300 Mbps
802.11n Support	3x3 MIMO with 2 spatial streams 20MHz and 40MHz channels supported 300Mbps data rates per radio Packet aggregation (AMSDU,AMPDU) Reduced interframe spacing
802.11 b/g/n	Operating frequency 2.4 - 2.483 GHz Maximum EIRP 32 dBm*****
802.11 a/n	Operating frequency 4.940 GHz - 4.990 GHz and 5.25 GHz - 5.35 GHz and 5.470 GHz - 5.825 GHz Maximum EIRP 34 dBm*** ****

*** Maximum EIRP may vary based on local standards for the area of deployment.**

**** Operating frequency of 4.9 is not available in some countries.**

4.4 Networking and Software Specifications

Security	Stateful Firewall, IP filtering, NAT, 802.1X, 802.11i WPA2, WPA 24x7 Dual band sensor capabilities * (subject to software license keys and sensor radio SKU) Advanced forensics Connectivity troubleshooting Wireless Intrusion Prevention LiveRF
Quality of Service (QoS)	WMM, WMM-UAPSD, 802.1p, Diffserv and TOS
Routing	Layer 3 routing, 802.1q/p, DynDNS, DHCP server/client, BOOTP Client, PPPoE and LLDP

4.5 Approvals

Radio*	FCC Title 47, part 15, part 90; EN 301 489-17 EN 301 893, EN 300 328 Industry Canada; China SRRC Australia/New Zealand
Safety*	UL 60950-1, -22; CSA C22.2 No.60950-1-07, -22-07 CB-IEC 60950-1:2005 + A1: 2009, -22:2005; EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011
Certifications	RoHS/WEEE/CMM; CE

*** For more country specific regulatory information, please contact Motorola Solutions or your authorized partner.**

Warranty

- One (1) year on AP 7161 hardware (accessories not included)
- (30) day on accessories
- (90) day on software

5 Basic Troubleshooting

Basic troubleshooting recommendations for the AP 7161 Access Point are listed in the following table:

Indication	Response
LEDs are not lit	No power to device: • Verify 802.3at compatible source is connected via PoE • Verify AC source to PoE injector • Unit was configured with LEDs disabled
No Ethernet connectivity to this unit	No Ethernet connectivity to this unit
No wireless connectivity to this unit	No wireless connectivity to this unit

6 Regulatory Information

This device is approved under the Symbol Technologies, Inc. brand. Symbol Technologies, Inc. is a wholly owned subsidiary of Motorola Solutions, Inc. (collectively "Motorola").

All Motorola Solutions devices are designed to be compliant with rules and regulations in locations they are sold and will be labeled as required. Any changes or modifications to Motorola Solutions equipment, not expressly approved by Motorola Solutions, could void the user's authority to operate the equipment.

Local language translations are available at the following website:

http://supportcentral.motorolasolutions.com

Motorola Solutions devices are professionally installed, the Radio Frequency Output Power will not exceed the maximum allowable limit for the country of operation.

Antennas: Use only the supplied or an approved replacement antennas. Unauthorized antennas, modifications, or attachments could cause damage and may violate regulations.

6.1 FCC Approval Statement

Federal Communications Commission
Office of Engineering and Technology
Laboratory Division

Interim Plans to Approve UNII Devices Operating in the 5470 - 5725 MHz Band with Radar Detection and DFS Capabilities

The FCC, NTIA, FAA and industry are working to resolve interference to Terminal Doppler Weather Radar (TDWR) systems used near airports that has occurred from some outdoor wireless systems operating in the 5470 MHz – 5725 MHz band. These wireless devices are subject to Section 15.407 of our rules and when operating as a master device they are required to implement radar detection and DFS functions. We are continuing our work to develop long-term equipment authorization test procedures that will ensure that the devices comply with our rules that include protecting the TDWR operations. In the interim, the Commission will now allow certification of wireless master devices with radar detection function and with DFS capability, if they meet the following conditions:

1. Devices will not transmit on channels which overlap the 5600 – 5650 MHz band.**1**

2. Devices intended for outdoor use will be further restricted, as follows:

- Devices must be professionally installed when operating in the 5470 – 5725 MHz band.**2**
- Grantees must provide owners, operators and all such installers with specific instructions in their user's manual on requirements to avoid interference to TDWRs and information that meets the following instructions:
- Any installation of either a master or a client device within 35 km of a TDWR location shall be separated by at least 30 MHz (center-to-center) from the TDWR operating frequency **3**, **4**, and **5**.

1 The devices subject to the requirements in this KDB can select the initial channel for operation to avoid TDWRs and apply the Uniform Channel Spreading requirements (see FCC 06-96 in ET Docket 03-122 released June 30, 2006) on the remaining available frequency band of operation. All the other test procedures including the test radar patterns remain the same at the present time. A revision to the measurement procedure with modification to the Uniform Channel Spreading requirement and other changes will be released in the future. The Commission will also address the issue of any field upgrade option at that time.

2 The grantee must identify the specific expertise and the training required by the installers for installing these types of devices.

3 In some instances it is possible that a device may be within 35 km of multiple TDWRs. In this case the device must ensure that it avoids operation within 30 MHz for each of the TDWRs. This requirement applies even if the master is outside the 35 km radius but communicates with outdoor clients which may be within the 35 km radius of the TDWRs.

4 The requirement for ensuring 30 MHz frequency separation is based on the best information available to date. If interference is not eliminated, a distance limitation based on line-of-sight from TDWR will need to be used. In addition, devices with bandwidths greater than 20 MHz may require greater frequency separation.

- Procedures for the installers and the operators on how to register the devices in the industry-sponsored database with the appropriate information regarding the location and operation of the device and installer information is included.**6**
- Devices must meet all of the other requirements specified in Section 15.407, and it is prohibited to include configuration controls (e.g. country code settings or other options to modify DFS functions) to change the frequency of operations to any frequency other than those specified on the grant of certification for US operation.**7**
- All applications for equipment authorization must clearly show compliance with all of the technical requirements under worst case parameters, under user or operator control, based on frame rates, listen/talk ratios and user data transfer conditions.

All the devices subject to the DFS requirements must be submitted to the Commission's Laboratory Division for pre-grant testing and equipment authorization.8 The applicant must ensure that all equipment authorization applications subject to this interim procedure include appropriate attestations that the device has no option to change the DFS parameters and that transmissions are disabled at least in the 5600 – 5650 MHz band. The application must include the user's manual with the appropriate installation and operations requirements for the installers and operators.

We are continuing to evaluate additional measures that may need to be taken to further ensure against interference caused by 5 GHz outdoor wireless systems located near airports. While manufacturers have an obligation to ensure that their equipment complies with FCC rules, and must take steps to ensure their devices are unlikely to cause harmful interference, Section 15.5 of the Commission's rules also places an obligation on users of devices to avoid causing interference and to correct any interference that may occur.

We encourage the manufacturers to include information for the users, including the operators and installers, to ensure that they understand that it is incumbent on them to cooperate with manufacturers to implement any changes necessary to facilitate compliance.

5 Devices may be optionally designed not to transmit on channels which overlap 5570 – 5680 MHz instead of requiring installers to perform site-by-site adjustments. In that case it is still required that the devices should be installed professionally and the procedures for registering the device in the industry database should be included in the Users Manual.

6 When devices are deployed for mobility, do not assign frequencies of 5580 MHz and 5670 MHz.

7 A voluntary WISPA sponsored database has been developed that allows operators and installers to register the location information of the UNII devices operating outdoors in the 5470 – 5725 MHz band within 35 km of any TDWR location (see http://www.spectrumbridge.com/udia/home.aspx). This database may be used by government agencies in order to expedite resolution of any interference to TDWRs.

8 For example, device software must not have any country code options or software configuration settings which allow an end user to modify the DFS operation or impact the performance of DFS. See KDB 594280.

9 The TCBs are not permitted to approve transmitters with radar detection capabilities. See KDB 628591.

10 The manufacturers may consider taking steps providing clear instructions to operators and installers of devices as to the need to comply with rules for use of the band, guidance on registration of devices and any other processes that are designed to avoid interference. They may use methods that include, but are not limited to, instructions in manuals, notification on product web pages and service bulletins issued for products in the field.

6.2 TDWR Location Information

STATE	CITY	LONGITUDE	LATITUDE	FREQUENCY	TERRAIN ELEVATION (MSL) [ft]	ANTENNA HEIGHT ABOVE TERRAIN [ft]
AZ	PHOENIX	W 112 09 46	N 33 25 14	5610 MHz	1064	64
CO	DENVER	W 104 31 35	N 39 43 72	5615 MHz	5643	64
FL	FT LAUDERDALE	W 080 20 39	N 26 08 36	5645 MHz	7	113
FL	MIAMI	W 080 29 28	N 25 45 27	5605 MHz	10	113
FL	ORLANDO	W 081 19 33	N 28 20 37	5640 MHz	72	97
FL	TAMPA	W 082 31 04	N 27 51 35	5620 MHz	14	80
FL	WEST PALM BEACH	W 080 16 23	N 26 41 17	5615 MHz	20	113
GA	ATLANTA	W 084 15 44	N 33 38 48	5615 MHz	962	113
IL	MCCOOK	W 087 51 31	N 41 47 50	5615 MHz	646	97
IL	CRESTWOOD	W 087 43 47	N 41 39 05	5645 MHz	663	113
IN	INDIANAPOLIS	W 086 26 08	N 39 38 14	5605 MHz	751	97
KS	WICHITA	W 097 26 48	N 37 30 26	5603 MHz	1270	80
KY	COVINGTON	W 084 34 48	N 38 53 53	5610 MHz	942	97
KY	LOUISVILLE	W 085 36 38	N 38 02 45	5646 MHz	617	113
LA	NEW ORLEANS	W 090 24 11	N 30 01 18	5645 MHz	2	97
MA	BOSTON	W 070 56 01	N 42 09 30	5610 MHz	151	113
MD	BRANDYWINE	W 076 50 42	N 38 41 43	5635 MHz	233	113
MD	BENFIELD	W 076 37 48	N 39 05 23	5645 MHz	184	113
MD	CLINTON	W 076 57 43	N 38 45 32	5615 MHz	249	97
MI	DETROIT	W 083 30 54	N 42 06 40	5615 MHz	656	113
MN	MINNEAPOLIS	W 092 55 58	N 44 52 17	5610 MHz	1040	80
MO	KANSAS CITY	W 094 44 31	N 39 29 55	5605 MHz	1040	64

STATE	CITY	LONGITUDE	LATITUDE	FREQUENCY	TERRAIN ELEVATION (MSL) [ft]	ANTENNA HEIGHT ABOVE TERRAIN [ft]
MO	SAINT LOUIS	W 090 29 21	N 38 48 20	5610 MHz	551	97
MS	DESOTO COUNTY	W 089 59 33	N 34 53 45	5610 MHz	371	113
NC	CHARLOTTE	W 080 53 06	N 35 20 14	5608 MHz	757	113
NC	RALEIGH DURHAM	W 078 41 50	N 36 00 07	5647 MHz	400	113
NJ	WOODBRIDGE	W 074 16 13	N 40 35 37	5620 MHz	19	113
NJ	PENNSAUKEN	W 075 04 12	N 39 56 57	5610 MHz	39	113
NV	LAS VEGAS	W 115 00 26	N 36 08 37	5645 MHz	1995	64
NY	FLOYD BENNETT FIELD	W 073 52 49	N 40 35 20	5647 MHz	8	97
OH	DAYTON	W 084 07 23	N 40 01 19	5640 MHz	922	97
OH	CLEVELAND	W 082 00 28	N 41 17 23	5645 MHz	817	113
OH	COLUMBUS	W 082 42 55	N 40 00 20	5605 MHz	1037	113
OK	AERO. CTR TDWR #1	W 097 37 31	N 35 24 19	5610 MHz	1285	80
OK	AERO. CTR TDWR #2	W 097 37 43	N 35 23 34	5620 MHz	1293	97
OK	TULSA	W 095 49 34	N 36 04 14	5605 MHz	712	113
OK	OKLAHOMA CITY	W 097 30 36	N 35 16 34	5603 MHz	1195	64
PA	HANOVER	W 080 29 10	N 40 30 05	5615 MHz	1266	113
PR	SAN JUAN	W 066 10 46	N 18 28 26	5610 MHz	59	113
TN	NASHVILLE	W 086 39 42	N 35 58 47	5605 MHz	722	97
TX	HOUSTON INTERCONTL	W 095 34 01	N 30 03 54	5605 MHz	154	97
TX	PEARLAND	W 095 14 30	N 29 30 59	5645 MHz	36	80

STATE	CITY	LONGITUDE	LATITUDE	FREQUENCY	TERRAIN ELEVATION (MSL) [ft]	ANTENNA HEIGHT ABOVE TERRAIN [ft]
TX	DALLAS LOVE FIELD	W 096 58 06	N 32 55 33	5608 MHz	541	80
TX	LEWISDALE DFW	W 096 55 05	N 33 03 53	5640 MHz	554	31
UT	SALT LAKE CITY	W 111 55 47	N 40 58 02	5610 MHz	4219	80
VA	LEESBURG	W 077 31 46	N 39 05 02	5605 MHz	361	113
WI	MILWAUKEE	W 088 02 47	N 42 49 10	5603 MHz	820	97113

6.3 Wireless Country Approvals

Regulatory markings are applied to the device signifying the radio(s) are approved for use in the following countries: United States, Canada, Australia, and Europe.

Please refer to the *Declaration of Conformity (DoC)* for details of other country markings. This is available at: *http://www.motorolasolutions.com/doc*.

Note 1: For 2.4 GHz Products: Europe includes, Austria, Belgium, Bulgaria, Czech Republic, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Operation of the device without regulatory approval is illegal.

6.4 Health and Safety Recommendations

The Federal Communications Commission (FCC) with its action in ET Docket 96-8 has adopted a safety standard for human exposure to radio frequency (RF) electromagnetic energy emitted by FCC certified equipment. Motorola Solutions products meet the uncontrolled environmental limits found in OET-65 and ANSI C95.1, 1991. Proper operation of this radio according to the instructions found in this manual will result in user exposure that is substantially below the FCC recommended limits.

6.4.1 Warnings for the Use of Wireless Devices

Please observe all warning notices with regard to the usage of wireless devices.

6.4.2 Potentially Hazardous Atmospheres

You are reminded of the need to observe restrictions on the use of radio devices in fuel depots, chemical plants etc. and areas where the air contains chemicals or particles (such as grain, dust, or metal powders).

Safety in Hospitals

Wireless devices transmit radio frequency energy and may affect medical electrical equipment. When installed adjacent to other equipment, it is advised to verify that the adjacent equipment is not adversely affected.

6.5 RF Exposure Guidelines

6.5.1 Safety Information

The device complies with internationally recognized standards covering human exposure to electromagnetic fields from radio devices.

6.5.2 Reduce RF Exposure - Use Properly

Only operate the device in accordance with the instructions supplied.

6.5.3 Remote and Standalone Antenna Configurations

To comply with FCC RF exposure requirements, antennas that are mounted externally at remote locations or operating near users at stand-alone desktop of similar configurations must operate with a minimum separation distance of 28 cm from all persons.

6.6 Power Supply

Use only a power-over Ethernet 802.3at compliant solution. The required power rating is 25.5 Watts.

6.7 Wireless Devices - Countries

Country Selection

Select only the country in which you are using the device. Any other selection will make the operation of this device illegal.

Operation in the US

The available channels for 802.11 b/g operation in the US are Channels 1 to 11. The range of channels is limited by firmware.

The FCC requires that the FCC ID label be placed on the outside of the device. If the device is placed in a protective enclosure that requires tools to access, a permanent label with FCC ID must be placed on the exterior of the protective enclosure

6.8 Radio Frequency Interference Requirements - FCC

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

6.8.1 Radio Transmitters (Part 15)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

6.8.2 Radio Frequency Interference Requirements - Canada

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Devices using the 5.470 – 5.725 GHz band shall not be capable of transmitting in the 5.60-5.65 GHz band in Canada, make sure that Canada is the country selected during setup to ensure compliance.

Radio Transmitters

This device complies with RSS 210 of Industry & Science Canada. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

Ce dispositif est conforme à RSS 210 d'industrie et de la Science Canada. L'opération est sous réserve des conditions suivantes deux conditions: (1) ce dispositif peut ne pas causer l'interférence néfaste et (2) ce dispositif doit accepter n'importe quelle interférence reçue, y compris l'interférence qui peut causer l'opération peu désirée.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that permitted for successful communication.

This device has been designed to operate with the antennas listed in this guide, and having a maximum gain of 8 dBi (2.4 GHz) and 10 dBi (5 GHz) for radios one and two. Antennas not included in this list, or having a gain greater than 8 dBi (2.4 GHz) and 10 dBi (5 GHz) for radios one and two, are prohibited for use with this device. This device has been designed to operate with the antennas listed in this guide, and having a maximum gain of 4.5 dBi (2.4 GHz) and 7.5 dBi (5 GHz) for radio three. Antennas not included in this list, or having a gain greater than 4.5 dBi (2.4 GHz) and 7.5 dBi (5 GHz) for radio three, are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

Label Marking: The Term "IC:" before the radio certification signifies that Industry Canada technical specifications were met.

This device has been designed to operate with the antennas listed in the Enterprise Wireless LAN Antenna Specification Guide. Refer to the guide at *http://supportcentral.motorolasolutions.com*.

6.9 CE Marking and European Economic Area (EEA)

CE

The use of 2.4 GHz RLAN's, for use through the EEA, have the following restrictions:

- Maximum radiated transmit power of 100 mW EIRP in the frequency range 2.400 -2.4835 GHz
- France outside usage, the equipment is restricted to 2.400-2.45 GHz frequency range.
- Italy requires a user license for outside usage

6.10 Statement of Compliance

Motorola Solutions hereby declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. A Declaration of Conformity may be obtained from *http://www.motorolasolutions.com/doc*.

6.11 Other Countries

Australia

Use of 5 GHz RLAN's in Australia is restricted in the following band: 5.50 – 5.65 GHz.

Brazil

Regulatory Declarations for AP 7161 - BRAZIL

Note: The certification mark applied to the AP 7161 is for Restrict Radiation Equipment. This equipment operates on a secondary basis and does not have the right for protection against harmful interference from other users including same equipment types. Also this equipment must not cause interference to systems operating on a primary basis.

For more information consult the website *http://www.anatel.gov.br*.

Declarações Regulamentares para AP 7161 - Brasil

Nota: A marca de certificação se aplica ao Transceptor, modelo AP 7161. Este equipamento opera em caráter secundário, isto é, não tem direito a proteção contra interferência prejudicial, mesmo de estações do mesmo tipo, e não pode causar interferência a sistemas operando em caráter primário. Para maiores informações sobre ANATEL consulte o site: *http://www.anatel.gov.br*.

Chile

Este equipo cumple con la Resolución No 403 de 2008, de la Subsecretaria de telecomunicaciones, relativa a radiaciones electromagnéticas.

This device complies with the Resolution Not 403 of 2008, of the Undersecretary of telecommunications, relating to electromagnetic radiation.

Mexico

Restrict Frequency Range to: 2.450 – 2.4835 GHz.

Taiwan

NOTICE!

According to: Administrative Regulations on Low Power Radio Waves Radiated Devices

Article 12

Without permission granted by the DGT, any company, enterprise, or user is not allowed to change frequency, enhance transmitting power or alter original characteristic as well as performance to a approved low power radio-frequency devices.

Article 14

The low power radio-frequency devices shall not influence aircraft security and interfere with legal communications; If found, the user shall cease operating immediately until no interference is achieved. The said legal communications means radio communications are operated in compliance with the Telecommunications Act. The low power radio-frequency devices must be susceptible with the interference from legal communications or ISM radio wave radiated devices.

臺灣

低功率電波輻射性電機管理辦法

第十二條
經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

第十四條

低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。
前項合法通信，指依電信規定作業之無線電通信。
低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

限制頻率範圍是：2.400 - 2.4835 GHz。 最大發射功率：27dBm
5.250 - 5.350 GHz。 最大發射功率：17dBm
5.725 - 5.850 GHz。 最大發射功率：24dBm

2.4GHz：11個通道
5GHz： 8個通道

Wireless device operates in the frequency band of 5.25-5.35 GHz, limited for indoor use only.

在 5.25-5.35 秭赫頻帶內操作之無線資訊傳輸設備，限於室內使用

6.12 Waste Electrical and Electronic Equipment (WEEE)

English: For EU Customers: All products at the end of their life must be returned to Motorola Solutions for recycling. For information on how to return product, please go to: http://www.motorolasolutions.com/recycling/weee.

Français: Clients de l'Union Européenne: Tous les produits en fin de cycle de vie doivent être retournés à Motorola Solutions pour recyclage. Pour de plus amples informations sur le retour de produits, consultez : http://www.motorolasolutions.com/recycling/weee.

Español: Para clientes en la Unión Europea: todos los productos deberán entregarse a Motorola Solutions al final de su ciclo de vida para que sean reciclados. Si desea más información sobre cómo devolver un producto, visite: http://www.motorolasolutions.com/recycling/weee.

Български: За клиенти от ЕС: След края на полезния им живот всички продукти трябва да се връщат на Motorola Solutions за рециклиране. За информация относно връщането на продукти, моля отидете на адрес: http://www.motorolasolutions.com/recycling/weee.

Deutsch: Für Kunden innerhalb der EU: Alle Produkte müssen am Ende ihrer Lebensdauer zum Recycling an Motorola Solutions zurückgesandt werden. Informationen zur Rücksendung von Produkten finden Sie unter http://www.motorolasolutions.com/recycling/weee.

Italiano: per i clienti dell'UE: tutti i prodotti che sono giunti al termine del rispettivo ciclo di vita devono essere restituiti a Motorola Solutions al fine di consentirne il riciclaggio. Per informazioni sulle modalità di restituzione, visitare il seguente sito Web: http://www.motorolasolutions.com/recycling/weee.

Português: Para clientes da UE: todos os produtos no fim de vida devem ser devolvidos à Motorola Solutions para reciclagem. Para obter informações sobre como devolver o produto, visite: http://www.motorolasolutions.com/recycling/weee.

Nederlands: Voor klanten in de EU: alle producten dienen aan het einde van hun levensduur naar Motorola Solutions te worden teruggezonden voor recycling. Raadpleeg http://www.motorolasolutions.com/recycling/weee voor meer informatie over het terugzenden van producten.

Polski: Klienci z obszaru Unii Europejskiej: Produkty wycofane z eksploatacji nale¿y zwróciæ do firmy Motorola Solutions w celu ich utylizacji. Informacje na temat zwrotu produktów znajduj¹ siê na stronie internetowej http://www.motorolasolutions.com/recycling/weee.

Čeština: Pro zákazníky z EU: Všechny produkty je nutné po skonèení jejich životnosti vrátit spoleènosti Motorola Solutions k recyklaci. Informace o zpùsobu vrácení produktu najdete na webové stránce: http://www.motorolasolutions.com/recycling/weee.

Eesti: EL klientidele: kõik tooted tuleb nende eluea lõppedes tagastada taaskasutamise eesmärgil Motorola Solutions'ile. Lisainformatsiooni saamiseks toote tagastamise kohta külastage palun aadressi: http://www.motorolasolutions.com/recycling/weee.

Magyar: Az EU-ban vásárlóknak: Minden tönkrement terméket a Motorola Solutions vállalathoz kell eljuttatni újrahasznosítás céljából. A termék visszajuttatásának módjával kapcsolatos tudnivalókért látogasson el a http://www.motorolasolutions.com/recycling/weee weboldalra.

Svenska: För kunder inom EU: Alla produkter som uppnått sin livslängd måste returneras till Motorola Solutions för återvinning. Information om hur du returnerar produkten finns på http://www.motorolasolutions.com/recycling/weee.

Suomi: Asiakkaat Euroopan unionin alueella: Kaikki tuotteet on palautettava kierrätettäväksi Motorola Solutions-yhtiöön, kun tuotetta ei enää käytetä. Lisätietoja tuotteen palauttamisesta on osoitteessa http://www.motorolasolutions.com/recycling/weee.

Dansk: Til kunder i EU: Alle produkter skal returneres til Motorola Solutions til recirkulering, når de er udtjent. Læs oplysningerne om returnering af produkter på: http://www.motorolasolutions.com/recycling/weee.
Ελληνικά: Για πελάτες στην Ε.Ε.: Όλα τα προϊόντα, στο τέλος της διάρκειας ζωής τους, πρέπει να επιστρέφονται στην Motorola Solutions για ανακύκλωση. Για περισσότερες πληροφορίες σχετικά με την επιστροφή ενός προϊόντος, επισκεφθείτε τη διεύθυνση http://www.motorolasolutions.com/recycling/weee στο Διαδίκτυο.
Malti: Għal klijenti fl-UE: il-prodotti kollha li jkunu waslu fl-aħħar tal-ħajja ta' l-użu tagħhom, iridu jiġu rritornati għand Motorola Solutions għar-riċiklaġġ. Għal aktar tagħrif dwar kif għandek tirritorna l-prodott, jekk jogħġbok żur: http://www.motorolasolutions.com/recycling/weee.
Românesc: Pentru clienţii din UE: Toate produsele, la sfârşitul duratei lor de funcţionare, trebuie returnate la Motorola Solutions pentru reciclare. Pentru informaţii despre returnarea produsului, accesaţi: http://www.motorolasolutions.com/recycling/weee.
Slovenski: Za kupce v EU: vsi izdelki se morajo po poteku življenjske dobe vrniti podjetju Motorola Solutions za reciklažo. Za informacije o vračilu izdelka obiščite: http://www.motorolasolutions.com/recycling/weee.
Slovenčina: Pre zákazníkov z krajín EU: Všetky výrobky musia byť po uplynutí doby ich životnosti vrátené spoločnosti Motorola Solutions na recykláciu. Bližšie informácie o vrátení výrobkov nájdete na: http://www.motorolasolutions.com/recycling/weee.
Lietuvių: ES vartotojams: visi gaminiai, pasibaigus jų eksploatacijos laikui, turi būti grąžinti utilizuoti į kompaniją „Motorola Solutions“. Daugiau informacijos, kaip grąžinti gaminį, rasite: http://www.motorolasolutions.com/recycling/weee.

Latviešu: ES klientiem: visi produkti pēc to kalpošanas mūža beigām ir jānogādā atpakaļ Motorola Solutions otrreizējai pārstrādei. Lai iegūtu informāciju par produktu nogādāšanu Motorola, lūdzu, skatiet: http://www.motorolasolutions.com/recycling/weee.**Türkçe:** AB Müşterileri için: Kullanım süresi dolan tüm ürünler geri dönüştürme için Motorola Solutions'ya iade edilmelidir. Ürünlerin nasıl iade edileceği hakkında bilgi için lütfen şu adresi ziyaret edin: http://www.motorolasolutions.com/recycling/weee.

6.13 TURKISH WEEE Statement of Compliance

EEE Yönetmeliğine Uygundur

7 Motorola Solutions Support Center

If you have a problem with your equipment, contact support for your region.

Contact information is available at: *http://www.motorolasolutions.com/support*.

When contacting Motorola Solutions support, please provide the following information:

- Serial number of the unit
- Model number or product name
- Software type and version number

Motorola Solutions responds to calls by e-mail, telephone, or fax within the time limits set forth in support agreements. If you purchased your product from a Motorola Solutions business partner, contact that business partner for support.

Customer Support Web Sites

The Motorola Solutions Support Central Web site, located at *http://supportcentral.motorolasolutions.com/*

provides information and online assistance including developer tools, software downloads, product manuals and online repair requests.

Manuals

http://supportcentral.motorolasolutions.com/support/product/manuals.do

General Information

Obtain additional information by contacting Motorola Solutions at:

Telephone (North America): 1-800-722-6234

Telephone (International): +1-631-738-5200

Website: *http://www.motorolasolutions.com*

8 AP 7161 Series ROHS Compliance

部件名称 **(Parts)**	有毒有害物质或元素					
	铅 **(Pb)**	汞 **(Hg)**	镉 **(Cd)**	六价铬 **(Cr^{6+})**	多溴联苯 **(PBB)**	多溴二苯醚 **(PBDE)**
金属部件 (Metal Parts)	X	O	O	O	O	O
电路模块 (Circuit Modules)	X	O	O	O	O	O
电缆及电缆组件 (Cables and Cable Assemblies)	X	O	O	O	O	O
塑料和聚合物部件 (Plastic and Polymeric Parts)	O	O	O	O	O	O
光学和光学组件 (Optics and Optical Components)	O	O	O	O	O	O
电池 (Batteries)	O	O	O	O	O	O

O：表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。

X：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。

对销售之日的所售产品，本表表示，公司供应链的电子信息产品可能包含这些物质。注意：在所售产品中可能会也可能不会含有所有所列的部件。

This table was created to comply with China RoHS requirements for the Motorola Solutions AP 7161 model Access Point.

Motorola Solutions, Inc.
1301 E. Algonquin Rd.
Schaumburg, IL 60196-1078, U.S.A.
http://www.motorolasolutions.com

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